



Contamination Impact Assessment - Addendum

Wallarah 2 Coal Project

Hansen Bailey

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ABBREVIATIONS

ACM	Asbestos Containing Material
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AST	Above-ground Storage Tank
ASS	Acid Sulphate Soil
B(a)P	Benzo(a)Pyrene
BGL	Below Ground Level
BH	Borehole
BTEX	Benzene, Toluene, Ethyl Benzene, Xylene
COC	Chain of Custody documentation
CLM	Contaminated Land Management
DA	Development Application
DEC	Department of Environment and Conservation (NSW)
DECC	Department of Environment and Climate Change (NSW)
DECCW	Department of Environment, Climate Change and Water (NSW)
DLA	DLA Environmental Services
DP	Deposited Plan
DQO	Data Quality Objective
EC	Electrical Conductivity
EIL	Ecological Investigation Level
EMP	Environmental Management Plan
EPA	Environment Protection Authority (NSW)
ESL	Ecological Screening Level
HIL	Health-Based Investigation Level
LOR	Limit of Reporting
MW	Monitoring Well
NATA	National Association of Testing Authorities, Australia
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environmental and Heritage
OPP	Organophosphorus Pesticides
OH&S	Occupational Health and Safety
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCOC	Potential Contaminants of Concern
PID	Photo-Ionisation Detector
PQL	Practical Quantification Limit
QA/QC	Quality Assurance and Quality Control
RAP	Remedial Action Plan
RPD	Relative Percentage Difference
SAC	Site Acceptance Criteria
SAQP	Sampling Analysis and Quality Plan
SEPP	State Environmental Planning Policy
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leaching Procedure
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WHS	Work Health Safety

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1.0 INTRODUCTION

1.1 General

DLA Environmental Services (DLA) was commissioned by Sparke Helmore and Hansen Bailey Environmental Consultants (Hansen Bailey) to undertake a technical land contamination study to support an Amendment Document for the proposed Wallarah 2 Coal Project (the Project).

The Wyong Areas Coal Joint Venture (WACJV) is seeking development consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Wallarah 2 Coal Project (the Project). The key features of the Project include:

- A deep underground longwall mine extracting up to 5 million tonnes per annum (Mtpa) of export quality thermal coal;
- The Tooheys Road Site between the M1 Motorway and the Motorway Link Road, which includes a portal, coal handling facilities and stockpiles, water and gas management facilities, small office buildings, workshop, rail spur and train load out bin and connections to the municipal water and sewerage systems;
- The Buttonderry Site near the intersection of Hue Hue Road and Sparks Road, which includes administration offices, bathhouse, personnel access to the mine, ventilation shafts and water management structures;
- The Western Shaft Site in the Wyong State Forest, which includes a downcast ventilation shaft and water management structures;
- An inclined tunnel (or “drift”) from the surface at the Tooheys Road Site to the coal seam beneath the Buttonderry Site;
- Transportation of product coal to the Port of Newcastle by rail; and
- An operational workforce of approximately 300 full time employees (including contractors).

The Project has been subject to the assessment process under Division 4.1 of Part 4 of the EP&A Act, including a review by the Planning Assessment Commission (PAC). In June 2014, the PAC concluded that *‘if the recommendations concerning improved strategies to avoid, mitigate or manage the predicted impacts of the project are adopted, then there is merit in allowing the project to proceed’*.

Following the review by the PAC, the Tooheys Road Site was re-designed to avoid land use conflicts with third parties. The changes to the design of the Tooheys Road Site (the Amendment) include:

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- Removal of the previously proposed rail loop;
- Re-location of the rail spur and train load out facility to the eastern side of the Main Northern Rail Line;
- A conveyor system to deliver product coal from the stockpile to the new train load out facility; and
- Realignment of the sewer connection.

These proposed changes are referred to as the 'Amendment'. All other aspects of the Project remain identical to the original proposal.

To give effect to the proposed changes to the Project, WACJV is seeking an amendment to the Development Application (DA) under clause 55 of the *Environmental Planning and Assessment Regulation 2000*. This report forms part of the "Amendment to Development Application SSD-4974" (Amendment Document) being prepared by Hansen Bailey to support the application to amend the DA.

This report assesses the environmental impacts of the proposed changes from a contamination perspective, to the Tooheys Road Site and where necessary, recommends additional management and mitigation measures to ameliorate these impacts. Aspects of the Project that are unchanged have not been reconsidered. The impacts associated with these aspects of the Project will remain as assessed in the *Wallarrah 2 Coal Project Environmental Impact Statement* (Hansen Bailey, 2013).

Refer to **Figure 1** – Site Location and **Figure 2** – Site Layout with Sampling Locations

1.2 Objectives

The objectives of the Investigation were to:

- Identify any Potential Contaminants of Concern (PCOCs) by conducting a desktop search to determine potential sources of contamination (from previous land uses) and identify locations for further field investigations;
- Undertake the necessary soil sampling investigations within the corridor for the alternate coal load out arrangement;
- Undertake the necessary analyses of the soil samples in accordance with the relevant standards and guidelines;
- Assess the contamination risks associated with the alternate coal load out arrangement, having regard to the same issues as those considered in the EIS and Response to Submissions

(RTS) Report completed by Hansen Bailey & Planning Assessment Commission (PAC) Review Report;

- Identify any additional mitigation measures that are required as a result of the Amendment; and
- Prepare a draft Contamination Impact Assessment Addendum for inclusion as an appendix to the Amendment Document.

The proposed investigation program and site investigation were designed to be suitable for due diligence purposes for incorporation into the Amendment Document and the ongoing management of the site. It is suitable for review by the NSW Department of Planning & Environment, NSW EPA, Department of Natural Resources (DNR) and the Wyong Shire Council. In particular the document meets the requirements of SEPP 55.

1.3 Scope of Works

The Investigation was conducted using the following methods:

- Review the PAC's Merits Review Report (PAC Report), Director General's Requirements (DGRs) for the Project and relevant legislation and government assessment guidelines;
- Review of the CIA to determine PCOCs associated with underlying fill or natural materials within the areas previously proposed to facilitate the coal load out arrangement;
- Conduct a gap analysis of the CIA and RTS, focusing on the changes in regulatory requirements or guidelines introduced since the publication of the studies;
- Undertake a Sampling Analysis and Quality Plan (SAQP) to provide a procedure for sampling and analysis, and identify potential sources of contamination within the proposed corridor;
- Conduct a soil sampling investigation within the proposed corridor, focusing on the agricultural land, Boral Montoro quarry, land adjacent to the Motorway Link Road and Crown Road (Nikko Road) and vegetated land adjacent to the Main Northern Rail Line;
- Conduct a surface water and sediment sampling investigation within the Addendum Study Area, focusing on Spring Creek and the tributary of Spring Creek adjacent to the Main Northern Rail line;
- Review results of analysis undertaken to determine PCOCs located within the Addendum Study Area;
- Assess the contamination risks associated with the Amendment; and
- Assess the need (if any) for mitigation and/or further investigations associated with the Amendment.

The Investigation has been conducted in accordance with the following:

- *Australian and New Zealand Guidelines for Assessment and Management of Contaminated Sites* (ANZECC, 1992);
- *Code of Practice for the Safe Removal of Asbestos*, (NOHSC, 2nd ed, 2005);
- *Contaminated Sites: Guidelines for Assessing Service Station Sites* (NSW EPA, 1994);
- *Contaminated Site: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, 2011);
- *Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2nd ed., 2006);
- *Contamination Sites: Sampling Design Guidelines* (EPA, 1995);
- *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1)* (NEPC, 2013);
- *Managing Land Contamination, Planning guidelines, SEPP 55: Remediation of Land* (DUAP, 1998);
- *How to Safely Remove Asbestos: Code of Practice* (WorkCover, 2011);
- *Storage and Handling of Dangerous Goods Code of Practice 2005*; and
- *Work Health and Safety Act 2011* (NSW) and associated regulations.

1.4 Data Quality Objectives

The NEPM (NEPC, 2013) and Australian Standard (AS) 4482.1-2005 recommend that data quality objectives (DQOs) be implemented during the validation of remediated sites. The DQO process described in *AS 4482.1-2005 Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Compounds* outlines seven distinct steps to outline the project goals, decisions, constraints and an assessment of the project uncertainties and how to address these when they arise. They define the quality and quantity of data needed to support decisions relating to the environmental condition of a site. They also outline the defining criteria that a data collection design should satisfy, including when, where, how and how many samples should be collected. The Laboratory Limit of Reporting (LOR) is the lowest level of reporting that can be reliably achieved within the specified limits set for precision and accuracy during routine laboratory operating conditions.

The DQOs have been summarised the table below:

Table 2a – Summary of DQOs

1	State the Problem	<p>Determine, from a contamination point of view, if the land is suitable for mixed land use in accordance with the requirements of <i>State Environmental Planning Policy No. 55</i> and the <i>Environmental Planning and Assessment Act 1979</i>. This includes identification of chemicals of concern, media they inhabit and possible migration pathways (to and from the site), potential exposures to human and/or environmental receptors, and concerns with the potential clean up and desired future land use of the property.</p>
2	Identify the Decisions	<p>Investigations into the site need to determine if contamination has potential to be present from previous land use activities or off-site sources, therefore presenting an unacceptable risk to human health or the environment and preventing the site being suitable for the intended future land use.</p> <p>The decisions to be made on the contamination and the new environmental data required includes considering relevant site contamination criteria for the imported soil. This will be undertaken by analysing the collected samples to identify any potential contamination sources. A proposed use of the 95% UCL on the mean concentrations for all soil chemicals of potential concern must be less than the Site criteria identified for Residential with minimal soil access and Open Space land use suitability. Decisions include:</p> <ul style="list-style-type: none"> - Do soils on site comply with the intended land use criteria? - If contamination is found, can the soils be remediated in conjunction with the development land?
3	Identify Inputs to Decisions	<p>This step requires the identification of the environmental variables/characteristics that need measuring, identification of which media (fill) need to be collected, identification of the site criteria for each medium of concern and appropriate analytical testing. This will include collection and analysis of representative samples from each of the areas of concern identified at the site. Particular attention will be given to:</p> <ul style="list-style-type: none"> - The risk associated with contaminant concentrations in soil; - Previous condition of the land; and - Proposed land use.
4	Define Study Boundaries	<p>Specify the spatial and temporal aspects of the environmental media that the data must represent to support the decision. To identify the boundaries (both spatial and temporal) of the investigation and to identify any restrictions that may hinder the assessment process. This includes onsite inspections and discussions with informed individuals.</p> <ul style="list-style-type: none"> - The physical study of soil will focus on delineation and further assessment of soils across the site; - The assessment will also consider previous site condition where relevant information is available; and, - The study will address any previous data gaps that may have been identified.

5	Develop Decision Rule	<p>To define the parameter(s) of interest, specify the action level and provide a logical basis for choosing from alternative actions. The following publications have been reviewed with respect to the assessment criteria and sampling methodology of soils at the site:</p> <ul style="list-style-type: none"> - NSW EPA Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, 2000; - NSW EPA Excavated Natural Material (ENM) Exemption 2012; - Schedule B1 Guideline on the Investigation Levels for Soil and Groundwater from the National Environment Protection (Assessment of Site Contamination) Measure 2013 Table 1(A)1 Column D – Commercial/Industrial; - NSW EPA Planning Guidelines SEPP 55 – Remediation of Land, 1998; - NSW EPA Contaminated Sites: Sampling Design Guidelines, 1995; and, - NSW EPA Guidelines for the NSW Site Auditor Scheme, second edition 2006. <p>The general site adopted statistical criteria being applied to the Table 1(A)1 Column D – Commercial/Industrial is:</p> <ul style="list-style-type: none"> - The 95% Upper Confidence Limit (UCL) of the arithmetic mean does not exceed the NEPM, 2013 Health Investigation Level (HIL); - The individual contaminant concentration should not exceed the HIL by more than 250%; - The standard deviation of individual contaminants should not exceed 50% of the HIL.
6	Specify Limits on Decision Errors	<p>Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data. Incorrect decisions are caused by using data that is not representative of site conditions because of sampling or analytical error.</p> <p>A site under investigation is assumed to be contaminated until statistically proven otherwise (eg: Ho= Analyte 95% UCL exceeds the SAC). Therefore two types of error are possible; Type 1 error (α or false negative), where the site is assessed to be uncontaminated when it is actually is, and Type 2 error (β or false positive), when the site is assessed to be contaminated though is actually not. Type 1 errors represent greater risk to the environment and human health and are therefore set at 5% probability, whilst Type 2 errors are set at 20% probability limit.</p> <p>Field and laboratory quality controls are implemented to avoid error and to ensure the action levels exceed the measurement detection limits for Potential Contaminants Of Concern (PCOCs) detected in field blanks, rinsate blanks, volatile-spiked trip samples and laboratory method blanks. The performance of decision making inputs will be enhanced through the application of Data quality indicators (DQI). They are outlined in Table 2b below.</p>
7	Optimise Design for Obtaining Data	<p>Identify a resource-effective sampling and analysis design for data collection that satisfy the DQO's. The sampling and analytical plan is designed to avoid Type 1 and Type 2 errors and includes defining minimum sample numbers required to detect contamination as determined with formulas provided in the NSW EPA 1995 <i>Sampling Design Guidelines</i> and AS 4482.1 - 2005.</p>

Table 2b: Data Quality

DATA PRECISION AND ACCURACY	
Adequate Sampling Density	A Judgemental approach has been undertaken for this Phase 1 Site Assessment Addendum.
	Use of analytical laboratories with adequately trained and experienced testing staff experienced in the analyses undertaken, with appropriate NATA certification.
	<p>>10 x Laboratory Limit of Reporting (LOR): 30% inorganics; 50% organics (Field)</p> <p><10 x LOR: Assessed on individual basis (Field)</p> <p>>5 x LOR: 50% (laboratory)</p> <p><5 x LOR: No Limit (laboratory)</p>
Acceptable Relative Percentage Difference (RPD)	
In accordance with AS4482.1 – 2005 field duplicate RPD criteria is increased with organic analytes and for low concentrations. These criteria cannot reasonably exceed the laboratory's precision, therefore laboratory criteria have been adopted.	
Trip Blanks/Rinsate Blanks	No Detection above Laboratory LOR
Trip Spikes	Recoverable concentrations of volatiles between 60 – 140%
Adequate Laboratory Performance	Based on acceptance criteria of laboratory as specified on certificate of analysis, includes: blank samples, matrix spikes, control samples, and surrogate spike samples.
	Use of analytical laboratories with adequately trained and experienced testing staff experienced in the analyses undertaken, with appropriate NATA certification.
DATA REPRESENTATIVENESS	
Sample and Analysis Selection	Representativeness of all PCOCs.
Trip Blanks	No detection above LOR.
Trip Spikes	Recoverable concentrations of volatiles between 60 – 140%.
Duplicate Samples	Adequate duplicate, split, rinsate and trip blank sample numbers
Laboratory Selection	Adequate laboratory internal quality control and quality assurance methods, complying with the NEPM (NEPC, 2013).

DOCUMENTATION COMPLETENESS	
Chain of Custody Records	Laboratory sample receipt information received confirming receipt of samples intact and appropriate chain of custody.
	NATA registered laboratory results certificates provided.
DATA COMPLETENESS	
	Analysis for all PCOCs.
	Field duplicate sample numbers complying with NEPM (NEPC, 2013)
	Trip spike samples prepared and sent with field samples regularly.
	Trip spike samples prepared and sent with field samples regularly
COMPARABILITY	
	Use of NATA registered laboratories.
	Detailed logs of all sample locations recorded.
	Test methods consistent for each sample in accordance with the Sampling Analysis and Quality Plan
	Test methods comparable between primary and secondary laboratory
	Acceptable RPD's between original samples and field duplicates and inter-laboratory triplicate samples.

1.5 Statutory Framework

The environmental planning statutes in New South Wales, which may apply are:

- *Contaminated Land Management Act 1997;*
- *Protection of the Environment Operations Act 1997;*
- *Dangerous Goods (Road and Rail Transport) Act 2008;*
- *Ozone Protection Act 1989;*
- *Environmental Planning and Assessment Act 1979; and*
- *Local Government Act 1993.*

The POEO Act also incorporates the major regulatory provisions of *the Waste Minimisation and Management Act 1995*. The repealed Acts are incorporated into the POEO Act. Thus, regulations made under the repealed Acts are now regulations under the POEO Act or until otherwise amended and licences issued under the repealed Acts are deemed to be licences under the POEO Act. The POEO Act provides a common licence to cover emissions to all environmental media. The Act lists certain “scheduled activities” (including coal mining) which need to be licensed.

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The *Contaminated Land Management Act 1997* specifies the legal requirements for the registration, investigation and remediation of contaminated land, and for the registration and accreditation of site auditors. It repeals the requirements of the *Environmentally Hazardous Chemicals Act 1985* in relation to audits and the accreditation of site auditors.

The *Environmental Planning and Assessment Act 1979* gives consent authorities the power to regulate development within their areas of responsibility and to impose specific consent conditions, which cover environmental issues. In addition, the *Local Government Act 1993* requires approval from Council for certain works/activities to be obtained.

2.0 SITE DESCRIPTION

2.1 Site Identification

The site identification details are summarised in **Table 2a** below:

Table 2a – Site Identification Summary

ITEMS	DETAILS
Site Name	Addendum Study Area
Address	Tooheys Road and Land adjacent to the Main Northern Rail Line, Bushells Ridge, NSW 2259
Local Government Authority	Wyong
Associated Lots and Deposited Plans	Lot 126 DP 755245, Lot 128 DP 658436, Lot 103 DP 755245, Lot 194 DP 1032847, Lot 4 DP 1191566 and Lot 168 DP 705480
Development Controls	Wyong LEP 2013
Site Zoning	General Industrial (IN1), Transition (RU6), Infrastructure (SP2) and Environmental Conservation (E2).
Current Use (NEPM 2013 Table 1A(1))	Combination of Residential and Commercial/Industrial
Proposed Use (NEPM 2013 Table 1A(1))	Commercial/Industrial
Site Area (approx.)	7.6 ha
Locality Map	Refer to Figure 1 – Site Location
Site Layout	Refer to Figure 2 – Site Layout with Sampling Locations

2.2 Site Changes Associated with the Amendment

2.2.1 Associated Property Changes

The properties identified in the CIA associated with the Amendment have undergone changes in both address and zoning as per the Wyong LEP (2013). The CIA was undertaken under the provisions of the previous Wyong LEP (1991). The address changes are listed in **Table 2b** and the zoning changes are listed in **Table 2c**. Several properties associated with the Project are Roads and Maritime Services (RMS) or Crown Land.

Table 2b Property Address Changes

LOT	DP	IN CIA	PREVIOUS ADDRESS	CURRENT ADDRESS	LAND USE
126	755245	Yes	9 Kiar Ridge Road, Kiar NSW 2259	91 Tooheys Road, Bushells Ridge NSW 2259	Agricultural and forested
128	658436	Yes	9 Kiar Ridge Road, Kiar NSW 2259	91 Tooheys Road, Bushells Ridge NSW 2259	Agricultural and forested
103	755245	Yes	9 Kiar Ridge Road, Kiar NSW 2259	91 Tooheys Road, Bushells Ridge NSW 2259	Agricultural and forested
194	1032847	Yes	425 Bushells Ridge Road, Bushells Ridge NSW 2259	234 Tooheys Road, Bushells Ridge NSW 2259	Boral Montoro - Quarry
168	705480	No	New under this Amendment	288 Tooheys Road, Bushells Ridge NSW 2259	Boral Montoro – Factory and offices

Refer to **Appendix C** - Historical Title Searches

Table 2c Property Zoning Changes

LOT	DP	PREVIOUS ZONING	CURRENT ZONING
126	755245	Primarily zoned 4(e) Regional Industrial and Employment Development, with a small area that will not form part of the project zoned 7(g) Wetlands Management.	Primarily zoned General Industrial (IN1) with a small area that will not form part of the Project zoned E2 Environmental Conservation
128	658436		
103	755245		
194	1032847		
168	705480		
RMS Road adjacent to Motorway Link Road		New under this Amendment	SP2 Infrastructure
4	1191556	New under this Amendment	SP2 Infrastructure
Crown Road adjacent to Main Northern Rail Line		New under this Amendment	RU6 Transition and E2 Environmental Conservation

Refer to **Appendix D** - Wyong LEP Zoning Map

2.3 Site Description and Current Land Use

The eastern boundary of the Extraction Area for the Project is located approximately 4.5 kilometres north-west of the Wyong CBD and lies solely within the WSC Local Government Area. A large proportion of the Extraction Area is located beneath the Wyong State Forest and adjacent forested hills, including beneath part of the Jilliby State Conservation Area.

This Addendum assesses the impacts of coal being transported along an alternate route from the end of the product coal stockpile to the Main Northern Rail Line via a conveyor system.

The Addendum Study Area is located in Bushells Ridge, NSW and is currently occupied by farms, farm buildings, roadways, vegetated land, a railway line and creeks. A train loading facility and rail siding will be constructed adjacent to the Main Northern Rail Line. The corridor encompasses an area of approximately 7.6 ha and includes land within the Boral Montoro Quarry, RMS owned land adjacent to the Motorway Link Road, a Crown Road adjacent to the Main Northern Rail Line and the Main Northern Rail Line corridor.

Refer to **Figure 1** – Site Location and **Figure 2** - Site Layout with Sampling Locations.

2.4 Environmental Setting

2.4.1 Boundaries and Surrounding Land Use

Property boundaries of the proposed alternate coal load out arrangement consist of wire fencing with locked gates and are maintained by representatives of WACJV in the western portion of the Addendum Study Area. These properties consist of agricultural land with some bushland. As the Addendum Study Area continues east through the Crown land currently occupied by the Boral Montoro quarry and factory, the boundaries consist of wire fencing and locked gates maintained by representatives of Boral Montoro. This section consists of partially cleared bushland. Extending from this section to the Main Northern Rail Line, the Addendum Study Area consists of bushland currently maintained by RMS. After passing to the east of the Main Northern Rail Line, the Addendum Study Area continues north through a partially cleared and partially forested Crown Road east of the Main Northern Rail Line, encompassed by wire fencing and locked gates to the west (maintained by Sydney Trains) and a predominantly unformed/unmade Crown Road. There is a creek crossing of Spring Creek and one of its tributaries within this section of the Addendum Study Area. The Addendum Study Area continues north within the Main Northern Rail Line corridor and terminates at the Gosford Road overpass.

The boundary and surrounding landscape features of the Addendum Study Area are summarised in **Table 2d** below:

Table 2d – Boundaries and Surrounding Land Use

DIRECTION	DETAILS
North	Forested and agricultural land, Boral Montoro Quarry and Factory
East	Forested and agricultural land and Crown Road
South	Forested and agricultural land, Tooheys Road and Motorway Link Road
West	Forested and agricultural land and the Main Northern Rail Line.

Refer to **Appendix E** - Aerial Photography.

2.4.2 Site Hydrogeology

A search of the NSW Office of Environment and Heritage (OEH) groundwater works database indicated there are several registered bores within two (2) kilometres of the Addendum Study Area. Minimal information was available regarding the construction and uses of the bores. One (1) bore used for domestic purposes positioned to the east of the Tooheys Road Site indicates that water bearing layers are present at 17m and 30m. Wells installed for monitoring purposes positioned to the north of the Tooheys Road Site indicate that a water bearing layer exists at approximately 1-5m.

A comprehensive groundwater impact assessment was carried out for the Project by Mackie Environmental Research (2012). The specialist report included numerical computer simulations and predictions of mine water seepage and depressurisation/dewatering impacts on hard rock and alluvial lands.

Refer to **Appendix F** – Groundwater Bore Search Information.

2.4.3 Site Geology and Soils

The Wyong area is located within the north-eastern margin of the Sydney Basin and is in the southern part of the Newcastle Coalfield. In this region any economic coal resources are contained within the upper part of the Permian Newcastle Coal Measures. These strata outcrop to the far north and north-east of the region and dip gently to the south-west beneath the Project Boundary. The lowermost strata of the Narrabeen Group comprise the Dooralong Shale which consists of between 50m and 70m of shales and laminites. This sequence coarsens upwards to contain beds of pebbly sandstone.

The overlying Munmorah Conglomerate is generally 70m to 80m thick and consists of coarse and pebbly sandstones with occasional green-grey shales. Neither of these sequences outcrop in the proposed target mining area. Outcropping in the north-east of the area is the Tuggerah Formation, a 200 m thick sequence of sandstones with minor siltstones and rare conglomerates.

The Patonga Claystone, which consists of 80m to 110m of inter-bedded grey-green and red-brown claystone and minor fine-grained sandstones, commonly outcrops in the lower elevation areas throughout (and immediately beneath) the Yarramalong and Dooralong Valleys. The uppermost strata of the Narrabeen Group in the area belong to the Terrigal Formation and consist of sandstones and minor siltstones. This sequence occurs through the more elevated zones of the south-western half of the Project Boundary, which is typically covered by State Forests.

Unconsolidated Quaternary silts and sands occur as fill along the Yarramalong and Dooralong Valleys and beneath Tuggerah Lake. Thicknesses of up to 50m have been recorded. Two broad synclines, which are recognised regionally, traverse the area. The Macquarie Syncline traverses the western edge of Tuggerah Lake in a north-easterly direction. The Yarramalong Syncline traverses the extreme western edge of the Project Boundary in a similar orientation. (*ref: Wallarah 2 Coal Project Background Document prepared by Hansen Bailey, October 2011*).

2.4.4 Acid Sulphate Soils

Environmental Earth Sciences prepared a Soil and Land Capability Impact Assessment for the Wallarah EIS (2012). This assessment report made the following conclusions in regards to Potential Acid Sulphate Soils (PASS) or Actual Acid Sulphate Soils (AASS).

Known areas of PASS and AASS are currently outside of the Infrastructure Boundary and are therefore not proposed to be disturbed. In the event that AASS or PASS is encountered, prior to the commencement of activities, the proponent must prepare an Acid Sulphate Soils Management Plan to manage any AASS or PASS. The Plan should be prepared in accordance with the Acid Sulphate Soils Manual 1998 published by the NSW Acid Sulphate Soil Management Advisory Committee.

General considerations for minimising the impacts of AASS disturbance are included within the report prepared by *Environmental Earth Sciences dated October 2012*.

2.4.5 Site Meteorology

Climatic conditions in the region are recorded at the Bureau of Meteorology (BoM) Norah Head Australian Weather Station (AWS) (data available 1995 – 2011) and Narara Research Station (partial

data available 1916 – 2011, all data available 1954 – 2011). Temperatures range from an average maximum of 27.6°C in summer down to an average minimum of 4.7°C in the winter months. The predominant wind at Charmhaven is from the south-west.

2.5 Regulatory Controls

2.5.1 Wyong Shire Council Section 149 Certificate

A Planning Certificate was obtained from Wyong Shire Council under section 149 of the *Environmental Planning and Assessment Act 1979* for the property that was previously not within the Project Boundary (Lot 168 DP 705480). The properties located within the western section of the Addendum Study Area are primarily zoned General Industrial (IN1). A small area of land zoned Environmental Conservation (E2) is immediately outside the Addendum Study Area. The sections of the site adjacent to the Motorway Link Road and crossing the Main Northern Rail Line are zoned Infrastructure (SP2). The section of the site adjacent to the Main Northern Rail Line is primarily zoned Transition (RU6) with the remaining portion zoned Environmental Conservation (E2). The section of the Addendum Study Area within the Main Northern Rail Line corridor is zoned Infrastructure (SP2).

2.5.2 WorkCover Dangerous Goods Search

A WorkCover NSW search regarding the properties located in the Addendum Study Area, within their Stored Chemical Information Database (SCID), indicated that one Dangerous Goods License has been issued for Lot 168 DP 705480, for the use of one 210 kg Liquefied Petroleum Gas decanting cylinder. No other dangerous goods licences are held in relation to the land within the Addendum Study Area.

No dangerous goods search was completed for Lot 4 DP 1191556 as this lot does not contain any buildings to store dangerous goods which would require a licence. It has been utilised as the Main Northern Rail Line corridor from the mid-19th Century to present.

Refer to **Appendix E – Dangerous Goods Search**

2.5.3 Contaminated Land Record Search

A search was conducted of all records pertaining to Section 58 of the *Contaminated Land Management Act 1997* and revealed that the Addendum Study Area is not encumbered by any notices from the NSW EPA with regard to contaminated land. No properties in the vicinity of the Project were encumbered by any notices.

No matters apply to any of the properties within the Site Investigation Area under the *Contaminated Land Management Act 1997*.

2.5.4 Director Generals Requirements

The WACJV is seeking a Development Consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* for the Project. The following DGRs relevant to Contaminated Site Assessment and Remediation are outlined below in **Table 2e**.

Table 2e Director General's Requirements

DIRECTOR GENERALS REQUIREMENTS	RELEVANT SECTIONS OF REPORT
<ul style="list-style-type: none"> The EIS should include an assessment of the contaminated Site that is conducted in accordance with the guidelines made or approved under section 105 of the Contaminated Land Management Act 1997, for example: Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2000), Guidelines for the NSW Site Auditor Scheme - 2nd edition (DEC, 2006), Sampling Design Guidelines (EPA, 1995), National Environment Protection (Assessment of Site Contamination) Measure 1999 (or update). 	<p>Refer to Section 1.5 Statutory Framework, Section 2.5 Regulatory Controls, Section 6.0 Results, Section 7.0 Discussion and Section 8.0 Conclusions</p>
<ul style="list-style-type: none"> The EIS should provide the details on how the Site contamination will be remediated and/or managed so that the Site is or can be made suitable for the proposed use. 	<p>Refer to Section 8.0 Conclusions</p>
<ul style="list-style-type: none"> All reports should be prepared in accordance with the Guidelines for Consultants Reporting on Contaminated Sites (EPA, 2000). 	<p>Refer to Section 1.3 Scope of Works</p>

<ul style="list-style-type: none"> – The EIS should specify whether or not a Site auditor, accredited under the Contaminated Land Management Act 1997 has been or will be engaged to issue a Site audit statement to certify on the suitability of the current or proposed uses. 	<p>Refer to Section 8.0 Conclusions</p>
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2.6 Site History

2.6.1 Aerial Photograph Review

Aerial photographs from 1954 to 2006, available from the NSW Lands Department, were reviewed by DLA Environmental with relevant observations being summarised below for the proposed alternate coal load out arrangement. Copies of the photographs have been included within **Appendix F**.

Due to the heavily vegetated state of the site, ground conditions were not able to be clearly assessed in the aerial photography; however, clearing and building structures were observed.

Table 2f Aerial Photograph Review –Tooheys Road Site

AERIAL PHOTOGRAPH	DESCRIPTION
7/3/1954 Run 5	<ul style="list-style-type: none"> – The rail line is visible to the east; and – The Addendum Study Area and surrounding areas are completely undeveloped and heavily vegetated.
8/3/1964 Run 5	<ul style="list-style-type: none"> – The Addendum Study Area shows some minor agricultural development on the western portion of the site; – Tooheys Road is now visible in its original configuration; and – Several large disturbed easements are visible in the surrounding areas.
28/5/1975 Run 4	<ul style="list-style-type: none"> – There has been a slight expansion of the agricultural area within the Addendum Study Area to the east; – The individual lot boundaries are now visible; and – No further development has taken place.
27/4/1984 Run 4	<ul style="list-style-type: none"> – Much of the area of the remaining lots within the Addendum Study Area have been cleared of vegetation, with a configuration similar to the present day layout; – Tooheys Road has been straightened from its previous position; – Two structures are visible near the western boundary of the Addendum Study Area. One structure is visible on the northern side of Tooheys Road in the central area of the Addendum Study Area; – Properties cannot be distinguished easily in the aerial photos due to the resolution of the images; – Clearing has begun at the location of the current quarry; and – Construction of the F3 freeway is discernible to the west of the site.
21/9/1991 Run 6	<ul style="list-style-type: none"> – Vegetative cover and site configuration appear similar to previous aerial photos; – Construction of the F3 freeway is now complete; – The quarry appears to have expanded significantly in size; – The factory and offices have been built; and – More vegetation is evident directly east of the Main Northern Rail Line.
15/9/1994 Run 6	<ul style="list-style-type: none"> – No significant changes noted from previous aerial photos.
29/10/2001 Run 6	<ul style="list-style-type: none"> – Several small dams are now visible on some of the western properties on the Site; – More Vegetation is evident on the properties south west of Tooheys Road and east of the Main Northern Rail Line; and – No other significant changes noted from previous aerial photo.
11/04/06 Run 6	<ul style="list-style-type: none"> – No significant changes noted from previous aerial photo.

2.6.2 Historical Title Search

The historical title search indicates that three of the properties were in private ownership prior to their purchase by Wyong Coal Pty Limited in 1997 and 1998. Two properties are Crown Land and are currently utilised for the Boral Montoro quarry, factory and offices. The historical title summary is outlined in **Table 2g** below. No historical title search was completed for Lot 4 DP 1191556 as this area has been utilised for the Main Northern Rail Line corridor from the mid-19th Century to present. No other information is available regarding land use in the historical title information.

Table 2g Historical Title Summary for Proposed Alternate Coal Load out Arrangement

LOT/DP	DATE	SITE OWNER	LAND USE/ OCCUPATION
Lot 126/DP 755245	10/12/1981	Donald Wallace Macleod	-
	9/12/1997	Wyong Coal Pty Limited	-
Lot 128/DP 658436	17/4/1984	John Frederick Co	-
	14/10/1987	Donald Roderick Macleod	-
	13/5/1998	Wyong Coal Pty Limited	-
Lot 103/DP 755245	29/2/1984	Kenneth Ray Drake & Peter Morris Foster	-
	24/2/1998	Wyong Coal Pty Limited	-
Lot 194/DP 1032847		Crown Land	Boral Montoro quarry
Lot 168/DP 705480	23/08/1985	Crown Land – Special Lease to Montoro Resources Limited	Boral Montoro factory and offices
	14/03/1991	Crown Land – Special Lease to Montoro Clay Products Pty. Limited	Boral Montoro factory and offices

Refer to **Appendix C** – Historical Title Search.

2.6.3 Site History Summary

The Contamination Impact Assessment (CIA) undertaken by DLA in 2013 outlined a site history summary for the area of rural land within the site (Refer to **Section 2.5.4** in Ref: DLH1067 RA4 27-2-2013). The Boral Montoro section of the Addendum Study Area has been occupied as a quarry from 1985 onwards. Prior to this, the area was heavily vegetated. The section utilised for the corridor has remained vegetated throughout the use for the quarry and factory. The area adjacent to the railway corridor was cleared as farming land until 1975 and has gradually become more vegetated. There has never been any buildings within the portion of the Addendum Study Area east of the railway line.

Refer to **Appendix C** – Historical Title Search and **Appendix E** – Aerial Photography

3.0 SITE INVESTIGATION PLAN

3.1 Field Investigation Procedure

Field investigations within the Addendum Study Area were undertaken from November to January 2016 in accordance with the *NSW EPA Samples Guidelines 1994*, *NEPM 2013* and the *NSW EPA 2012 ENM General Exemption*. These included;

- Initial site Inspection, conducting a review of site history and aerial photographs to identify potential contaminant locations prior to the commencement of work;
- A targeted sampling program focusing on potential contaminants of concern/ materials;
- Collection of 22 soil samples for chemical analysis within the Addendum Study Area;
- Collection of seven soil samples for asbestos analysis within the Addendum Study Area;
- Collection of one fragment sample for asbestos analysis within the Addendum Study Area;
- Collection of three sediment samples within the Addendum Study Area; and
- Collection of three surface water samples within the Addendum Study Area.

These were collected from the following areas:

- Creek crossings;
- Railway line crossing;
- Around buildings;
- Former buildings
- Areas of significant disturbance;
- Crown Road under Motorway Link Road overpass;
- Crown Road parallel to Main Northern Railway Line; and
- Disturbed areas within the corridor between Boral Montoro Quarry and the Motorway Link Road.

A judgemental approach was taken in the selection of sampling locations to ensure the collection of representative samples from the site.

Refer to **Figure 2** – Site Layout with Sampling Locations.

3.1.1 Soil Collection

Soil samples for chemical analyses were generally collected in accordance with the *Sampling Design Guidelines* (NSW EPA, 1995), *NEPM* (NEPC, 2013) and *AS4482.1-2005*. Collected soil samples were immediately transferred to sample containers of appropriate composition (glass jars for chemical analysis, plastic bags for asbestos). Job number; sample identification number; sampler's initials and date of sampling were recorded on sample labels affixed to the sample containers.

Samples were then placed immediately into a chilled esky to prevent the loss of potential volatile components. The samples were transported under standard DLA chain-of-custody protocols to the NATA accredited laboratories – Envirolab Services Pty Ltd. All samples were stored and transported at temperatures below 4°C.

All samples were collected by DLA staff who are specifically trained in hazardous waste field investigation techniques and health and safety procedures. All techniques used are specified in *DLA Field Manual for Contaminated Sites* dated January 2016, which are based on methods specified by the United States Environment Protection Agency (US EPA) and NEPM (NEPC, 2013).

The sampling locations, number of samples collected within each location and analyte examined are summarised in **Table 3a** below.

Table 3a – Sample Collection and Analysis

Disturbed Areas within the Addendum Study Area from the product coal stockpile to the Boral Montoro Quarry	
Heavy Metals*	4 samples
vTRH / BTEX	4 samples
TRH	4 samples
PAHs	4 samples
Disturbed Areas within the Boral Montoro Quarry	
Heavy Metals*	5 samples
vTRH / BTEX	5 samples
TRH	5 samples
PAHs	5 samples
Asbestos (fines w/w %)	1 sample

RMS and Sydney Trains owned Land west of the Main Northern Railway Line	
Heavy Metals*	5 samples
vTRH / BTEX	5 samples
TRH	5 samples
PAHs	5 samples
Asbestos (fines w/w %)	2 samples
Disturbed areas underneath Motorway Link Road Overpass and adjacent to Main Northern Railway Line south of overpass	
Heavy Metals*	2 samples
vTRH/BTEX	2 samples
TRH	2 samples
PAHs	3 samples
Asbestos (Fines w/w %)	2 samples
Asbestos (Identification)	1 sample
Crown Road and Rail Corridor north of Motorway Link Road Overpass	
Heavy Metals*	5 samples
vTRH/BTEX	5 samples
TRH	5 samples
PAHs	5 samples
OC/OP/PCB Pesticides	5 samples
Asbestos (Fines w/w %)	2 samples
Spring Creek and the north and south tributaries that intersect the Main Northern Railway Line	
Heavy Metals*	3 samples (Water) + 3 Samples (Sediment)
vTRH / BTEX	3 samples (Water) + 3 Samples (Sediment)
TRH	3 samples (Water) + 3 Samples (Sediment)
PAHs	3 samples (Water) + 3 Samples (Sediment)
OC/OP/PCB Pesticides	3 samples (Water) + 3 Samples (Sediment)
Inter Laboratory Duplicates	
All required analytes	2 samples
Intra Laboratory Duplicates	
All required analytes	1 sample

* Eight Heavy Metals endorsed by the NSW EPA (As, Cd, Cr, Cu, Hg, Ni, Pb and Zn)

3.2 Field Sampling and Quality Control Plan

During the assessment of potentially contaminated sites, the integrity of data collected is considered paramount. For this assessment, a number of measures were taken to ensure the quality of the data:

Sample Containers

Soil samples collected during the assessment were placed immediately into laboratory prepared glass jars with Teflon lid inserts. Standard identification labels were adhered to each individual container and labelled according to depth, date, sampling team and media collected.

Sample Tracking and Identification

All samples were identified with a unique sample number and all sampling details were included on the sample label to be reproduced on the field sample log and chain of custody records.

Decontamination

All equipment used in the sampling program, which included a stainless steel trowel and a mixing bowl, was decontaminated prior to use and between samples to prevent cross contamination.

Decontamination of equipment involved the following procedures:

- Cleaning equipment in potable water to remove crosscontamination;
- Cleaning in a solution of Decon 90; and,
- Rinsing in clean demineralised water then wiping with clean lint free cloths.

Sample Transport

All samples were packed in ice from the time of collection and transported under chain of custody from the site to a NATA registered laboratory ensuring that all the samples arrived intact, with appropriate preservation medium and were analysed within their relative holding times for the respective analytes.

Field Duplicates

Field duplicates provide an indication of the precision for the whole investigation process, that is; the sampling process, sample preparation and chemical analysis. Two Inter-Laboratory duplicates were preserved for this investigation.

Field duplicate soil samples were prepared in the field through the following process:

A larger than normal quantity of soil was recovered from the sample location selected for duplication. The sample was placed in a decontaminated stainless bowl and mixed as thoroughly as practicable before being divided into equal parts;

- Two portions of the sub-sample were immediately transferred, one for an intra-laboratory duplicate and another for an inter-laboratory duplicate using the decontaminated trowel;
- Samples were placed into a labelled, laboratory supplied 250ml glass jar and sealed with an airtight, Teflon screw top lid. The fully filled jars were labelled as the duplicate and immediately placed in a chilled portable cooler; and,
- The remaining portions were stored in the same way and labelled as the original sample.

Due to volatile losses during duplicate preparation in the laboratory, duplicate samples were collected in the field. These samples were not used for validation of volatile compounds; they were strictly for internal quality control. Duplicate samples were prepared on the basis of sample numbers recovered during the fieldwork. Intra-laboratory duplicates were collected at a ratio of greater than 10% for the Project and Inter-Laboratory samples were collected at a rate of greater than 5%.

3.3 Analytical Strategy

Samples were analysed for listed chemicals based on potential contamination in the area and to allow for a preliminary assessment of all representative areas of the site. The Addendum Study Area was specifically targeted as part of this investigation. Other areas within the identified lots or areas were not considered part of the investigation. Samples were analysed for the following parameters:

3.3.1 Inorganic

- Heavy metals: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), and Zinc (Zn); and
- Asbestos.

3.3.2 Organic

- Total Recoverable Hydrocarbons (TRH);
- Monocyclic Aromatic Hydrocarbons (BTEX);
- Volatile TRH (vTRH); and,
- Polycyclic Aromatic Hydrocarbons (PAHs).
- Organochlorine Pesticides (OCP); and
- Polychlorinated Biphenyls (PCB).

No Photo Ionisation Detection (PID) assessments were undertaken as TRH analyses were performed on all samples.

SGS Australia Pty Ltd (SGS), a NATA accredited laboratory, completed the laboratory analysis of all soil, sediment and water samples and intra-laboratory duplicates (NATA Accreditation No 2562 and 4354). SGS are compliant with ISO 9001 and ISO/IEO 17025. Envirolab Services Pty Ltd (Envirolab), Willoughby, a NATA accredited laboratory, completed the laboratory testing of inter-laboratory duplicates (NATA Accreditation No 2901). Envirolab are compliant with ISO 9001 and ISO/IEO 17025. Australian Safer Environment and Technology (ASET), Hornsby, completed laboratory testing of all soil sampling for asbestos (NATA Accreditation No 14484). ASET are compliant with ISO/IEO 17025.

A summary of the soil analytical strategy for samples collected within the Addendum Study Area is provided within **Table 3b** below.

Refer to **Appendix H** - Quality Assurance and Quality Control and **Appendix H2** – Laboratory Analytical and Quality Plan.

Table 3b – Soil, Sediment and Surface Water Analytical Strategy

Sample ID	Sample Location	Contaminant Sources	Laboratory Analysis Selected
S2, S3, and S4	Tooheys Road – Rural Land	Herbicide and pesticide use, disease and parasite treatment in chickens, termite treatment in building structures, general waste	Organochlorine Pesticides (OCP); Organophosphorus Pesticides (OPP), Heavy Metals (As, Cu, Cr, Ca, Hg, Mn, Pb, Ni, Zn), Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH)
S5-Automotive	Tooheys Road – Evidence of previously burnt out vehicle	Motor vehicle waste	Heavy Metals, TPH and PAHs
BOR-1, BOR-2, BOR-5 and BOR-7 (soils) BOR-3 (asbestos)	Tooheys Road - Corridor within Boral Montoro Site	Works on site, bulk earthworks, furnace firing and waste disposal	OCP, OPP, Heavy Metals, TPH, PAHs and asbestos
W1, W2 and W3 (soils) W1, W2 (asbestos)	RMS Land and Western side of Rail Corridor	General waste, embankment fill material, pesticides, PAHs, heavy metals, historical railway activities	OCP, OPP, Heavy Metals, TPH, PAHs and asbestos
CR-3 (24/11), CR-4 (24/11), CR-Bitumen (soils) CR-3, CR-4 and CR-FRAG-BANK (asbestos)	Underneath Motorway Link Road Overpass and area south of Overpass	Building waste, general waste, bitumen, historical railway activities	OCP, OPP, Heavy Metals, TPH, PAHs and asbestos
CR-1, CR-2, CR-3 (08/12), CR/4 (08/12) and RC-3 (soils) CR-1 and RC-3 (asbestos)	Crown Road and Rail Corridor North of Motorway Link Road Overpass	Building waste, general waste, historical railway activities	OCP, OPP, Heavy Metals, TPH, PAHs and asbestos
CR-Sediment-1, CR-Sediment-2, CR-Sediment-3, CR-Water-1, CR-Water-2 and CR-Water -3	Spring Creek and its north and south tributaries that intersect the rail corridor	Historical railway activities, Industrial activities located within the catchment area	OCP, OPP, Heavy Metals, TPH and PAHs

4.0 ASSESSMENT CRITERIA

The following documents were reviewed with respect to selecting appropriate assessment criteria:

- Schedule B1 Guideline on the Investigation Levels for Soil and Groundwater from the *National Environment Protection (Assessment of Site Contamination) Measure 2013* Table 1(A)1 Column D – Commercial/Industrial;
- *NSW EPA Guidelines for the NSW Site Auditor Scheme, second edition 2006*; and,
- *NSW DECCW Waste Classification Guidelines, 2009*.

4.1 Rational for the Selection of Assessment Criteria

The criteria selected have been chosen in accordance with current Australian and NSW EPA guidelines. Australian Guidelines have been used in preference to international guidelines where available. These criteria are the most current and widely accepted guidelines in use at present in Australia, and have generally been developed using a risk-based approach. Therefore, the selected guidelines provide a satisfactory framework for the site assessment.

4.2 Soil Sampling Criteria

The guidelines proposed for the assessment of soil contamination for the Project were sourced from the following references:

- NEPC (1999) *National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM)*;

The NEPM was amended on 19 June 2013 by the NSW EPA under the *Contaminated Land Management Act 1997*. The NEPM amendment 2013 provided revised health-based soil investigation levels (HILs), health-based screening levels (HSLs), ecological-based investigation levels (EILs) and ecological based screening levels (ESLs) for various land uses. A summary of the applicability of these guidelines follows.

- The HILs are applicable for assessing human health risk via all relevant pathways of exposure and have been developed for four main land use categories. The HILs are generic to all soil types and apply generally to a depth of 3m below the surface for residential use.

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- HSLs for soil vapour intrusion from petroleum hydrocarbons are guidelines that prevent accumulation of vapours at concentrations that may represent a health risk. The HSLs are derived for various depths and are for the same generic land uses as for the HILs. The guidelines are relevant where soils are beneath building or structures such as confined spaces.
- EILs have been developed for commercial/industrial land use and are applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and generally apply to the top 2m of soil.
- ESLs have been developed for commercial/ industrial land use and are developed for selected petroleum hydrocarbon compounds and fractions and are applicable for assessing risk to terrestrial ecosystems. These are also generally applicable to the top 2m of soil.
- Management Limits where concentrations above these limits may indicate poor aesthetics, high odour and potentially explosive vapour. Management limits are to be applied after consideration of relevant ESLs and HSLs.

The site will be considered suitable for its intended land use if the UCL of the average concentration for each contaminant in soils complies with the respective Table 1(A)1 Column D – Commercial/Industrial HILs.

Where a sample result is beyond 250% of the criteria, or where the standard deviation of the data set is greater than 50% of the criteria, non-compliant locations are defined as not part of the general population of the site, but rather as a hotspot or a different population. Hotspots are defined as localised areas where contaminant concentration is noticeably higher than in surrounding areas and may be removed prior to final determination of Soil suitability.

The applicable assessment criteria for heavy metals, PAHs and pesticides soil are presented in **Table 4a**.

Table 4a: Soil Guidelines (mg/kg) – Health and Ecological Investigation Levels

	ANALYTES	HIL-D	HIL-C	EIL
HEAVY METALS	Arsenic	3,000	300	160 ¹
	Cadmium	900	90	-
	Chromium (VI)	3,600	300	-
	Chromium (III)	-	-	320 ² (1% clay)
	Copper	240,000	17,000	300 ²
	Lead	1,500	600	1,800 ¹
	Nickel	6,000	1,200	310 ²
	Zinc	400,000	30,000	700 ²
	Mercury (inorganic)	730	80	-
	Cyanide (free)	1,500	240	-
PAH	Naphthalene	NL	NL	370 ¹
	Carcinogenic PAHs (as BaP TEQ)	40	3	-
	Total PAHs	4,000	300	-
PESTICIDES	PCB	7	1	-
	Aldrin/Dieldrin	45	10	-
	Chlordane	530	70	-
	DDT+DDD+DDE	3,600	400	-

1. EILs represent the most conservative value possible as the lowest value for added contaminant limit (ACL) was used and the ambient background concentration (ABC) was not added.
2. Chromium III, nickel, zinc and copper EILs were calculated by adding the ACL with the estimated ABC using the NEPM (2013) EIL Calculation Spreadsheet for aged contamination under commercial/industrial land use.

The applicable assessment criteria for volatile PAHs in soil are presented in **Table 4b** and **Table 4c**.

Table 4b: Soil Assessment Guidelines for Vapour Intrusion - HSL D (mg/kg) – Sand

	TPH HSL Criteria for Commercial/Industrial Space Sandy Soils				Direct Contact
	0m to <1m	1m to <2m	2m to <4m	4m +	HSL-D
Toluene	NL	NL	NL	NL	430
Ethylbenzene	NL	NL	NL	NL	99,000
Xylene (total)	NL	NL	NL	NL	27,000
Naphthalene	NL	NL	NL	NL	81,000
Benzene	4	4	6	10	11,000
F1 – C₆-C₁₀	250	360	590	NL	26,000
F2 – C₁₀-C₁₆	NL	NL	NL	NL	20,000
F3 – C₁₆-C₃₄	NA	NA	NA	NA	27,000
F4 – C₃₄-C₄₀	NA	NA	NA	NA	38,000

NL = Not Limiting (i.e. the soil vapour concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario).

NA = Not Applicable (i.e. NEPM (NEPC, 2013) does not provide HSLs for the F3 and F4 hydrocarbon fractions)..

Vapour Intrusion Criteria sourced from NEPM (NEPC, 2013) *Table 1A(3) – Soil HSLs for vapour intrusion*.

Direct Contact Criteria sourced from Friebe and Nadebaum 2011, Health Screening Levels for petroleum Hydrocarbons in Soil and Groundwater, Part 1: Technical Development Document, *Table A4 – Soil Health Screening Levels for Direct Contact*.

1. The soil saturation concentration (C_{sat}) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds C_{sat}, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.
2. For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit >50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.
3. To obtain F2 subtract naphthalene from the >C₁₀-C₁₆ fraction.

Table 4c: ESLs and Management Limits for Petroleum Hydrocarbons in Soil

Chemical	Soil texture	ESLs (mg/kg dry soil)		Management Limits ¹ (mg/kg dry soil)	
		Commercial and Industrial	Urban residential and public open	Commercial and Industrial	Urban residential and public open space
Benzo(a)pyrene	Fine	0.7	0.7	-	-
F1^{2,4} C₆-C₁₀	Fine	215	180	800	800
F2 >C₁₀-C₁₆	Fine	170	120	1,000	1,000
F3 >C₁₆-C₃₄	Fine	2,500	1,300	5,000	3,500
F4 C₃₄-C₄₀	Fine	6,600	5,600	10,000	10,000

1. Management limits are applied after consideration of relevant ESLs and HSLs.
2. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.
3. ESLs are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability.
4. To obtain F1 for ESLs, subtract the sum of BTEX from C6-C10 fraction. For F2, naphthalene should not be subtracted as there is no separate ESL for naphthalene.

The HSLs for asbestos are applicable for assessing human health risk via the exposure pathway of inhalation of airborne asbestos and are presented in **Table 4d**. The HSLs are generic to all soil types.

Table 4d: Health screening levels for asbestos contamination in soil (w/w%)

Form of asbestos	Commercial/ Industrial D ¹
Bonded ACM	0.05%
FA and AF¹	0.001%
All forms of asbestos	No visible asbestos for surface soil

The screening level of 0.001% w/w asbestos in soil for FA and AF (i.e. non-bonded/friable asbestos) only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.

Asbestos Health Screening Levels sourced from NEPM (NEPC, 2013) Table 7.

1. NEPM (NEPC, 2013) Commercial/Industrial Criteria

4.3 Surface Water Criteria

The assessment criteria for the assessment of surface water were sourced from the following references:

- NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM)*;
- NSW DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*; and
- ANZECC & ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

The investigation levels presented in ANZECC and ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality are considered applicable for the protection of aquatic ecosystems of receiving waters. ANZECC (2000) advocates a site-specific approach to developing guideline trigger values based on such factors as local biological effects data and the current levels of disturbance of the ecosystem. The guidelines present 'low risk trigger values' which are defined as concentrations of key performance parameters below which there is a low risk of adverse biological effects. If these trigger values are exceeded, then further action is required which may include further site-specific investigations to assess potential contamination or management/ remedial action.

Low risk trigger values are presented in Table 3.4.1 of ANZECC (2000) for the protection of 80-99% of species in fresh and marine waters, with trigger values depending on the health of the receiving waters.

Surface water results will be compared against trigger values for the protection of 95% of freshwater species. A 95% protection of fresh water species was selected due to the surrounding residential and farming areas and the close proximity to a major arterial roadway and the Main Northern Rail Line. These trigger values are outlined in **Table 4f** and represent ecosystems in which aquatic biological diversity may have been adversely affected to a relatively small but measurable degree by human activity.

ANZECC (2000) indicates there is currently insufficient data to derive a high reliability trigger value for TRH but propose a low reliability trigger value of 7 µg/L. This guideline is considered by industry to be overly conservative and is below the TRH detection limit that most laboratories can achieve. Therefore the limit of reporting (LOR) was adopted as a screening trigger for TRH.

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Trigger values for cadmium, copper, nickel, lead and zinc can be modified for hardness, as the bioavailability of these heavy metals decreases with increasing hardness. Trigger values modified for hard waters have been used, as per Table 3.4.3 of ANZECC (2000).

Surface water results were also compared against trigger values for irrigation and stock watering. Section 4.3.4 of ANZECC (2000) indicates that stock watering trigger values for heavy metals and metalloids are for total concentrations, irrespective of whether the constituent is dissolved, complexed with an organic compound or bound to suspended solids. Fluoride is included in this section.

Investigation levels for livestock drinking water are not available for organic contaminants, such as TRH and PAHs. In the absence of available investigation levels, the limit of reporting (LOR) was adopted as a screening trigger for TRH and PAHs.

The long term trigger value has been used for irrigation guidelines. Section 9.2.5.11 of ANZECC (2000) indicates that the long term trigger value for fluoride is based on the assumption that the irrigation water could potentially be phytotoxic to sensitive plant species or could contaminate stock drinking water. As stock watering guidelines are for total metal and metalloid concentrations, total fluoride concentrations was used.

Table 4f: Water Guidelines (µg/L) – Groundwater Investigation Levels and ANZECC 95% Protection Level

Sampling Parameter	GIL (Freshwater)	ANZECC 95% (freshwater)
Arsenic	24 (As III) 13 (As V)	24 (As III) 13 (As V)
Cadmium	0.2	0.2
Chromium	1.0 (As VI)	1.0 ^c
Copper	1.4	1.4
Lead	3.4	3.4
Mercury	0.06	0.6 (Inorganic)
Nickel	11	11
Zinc	8	8.0
pH	-	6.5-8.5
Suspended Solids (TSS)	-	-
Electrical Conductivity (EC)	-	-
Total Dissolved Solids (TDS)	1.9	-
Benzene	950	950
Toluene	-	-
Ethylbenzene	-	-
Xylene	350 (As O) 200 (As P)	350 (As O) 200 (As P)
TPH	300#	300#

C = Figure may not protect key species from chronic toxicity (this refers to experimental chronic figures or geometric mean for species).

= Netherlands MPC, the **maximum permissible concentration** (MPC) is the 'concentration of a toxic substance that fully protects 95% of the species in an ecosystem' (Denneman & van den Berg 1993).

4.4 Sediment Sampling Criteria

The assessment criteria for the assessment of sediment samples were sourced from the following reference:

ANZECC & ARMICANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

The *Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC 2000)* provided a framework for managing receiving water quality. Those Guidelines recognised that total load and fate of contaminants, particularly to enclosed systems, should also be considered. Sediments are important, both as a source and as a sink of dissolved contaminants, as has been recognised for some time. As well as influencing surface water quality, sediments represent a source of bioavailable contaminants to benthic biota and hence potentially to the aquatic food chain. Therefore it is desirable to define situations in which contaminants associated with sediments represent a likely threat to ecosystem health.

Table 4f – Sediment Guidelines – ANZECC - Metals, Metalloids and Organometallics

	Analyte	ANZECC Sediment Guidelines (mg/kg dry wt.)	
		Trigger Value (Low Risk)	Remedial Action Required (High Risk)
Heavy Metals and Metalloids	Antimony	2	25
	Cadmium	1.5	10
	Chromium	80	370
	Copper	65	270
	Lead	50	220
	Mercury	0.15	1
	Nickel	21	52
	Silver	1	3.7
	Zinc	200	410
	Arsenic	20	70
	Tributyltin (µg Sn/kg dry wt.)	5	70

Table 4g – Sediment Guidelines – ANZECC - PAHs and Pesticides

Analyte		ANZECC Sediment Guidelines (µg/kg dry wt.)	
		Trigger Value (Low Risk)	Remedial Action Required (High Risk)
PAHs	Naphthalene	160	2,100
	Benzo(a)pyrene	430	1,600
	Total PAHs	4,000	45,000
	DDT+DDE+DDD	1.6	20
Pesticides	Chlordane	0.5	6
	Dieldrin	0.02	8
	Total PCBs	23	-

4.5 Limitations of the Assessment Criteria

All criteria have limitations. Not all chemical analytes are covered by each set of guidelines, requiring some criteria to be sourced from elsewhere. This is particularly relevant to the Dutch Intervention guidelines, which provide a guideline for assessment for some analytes not covered by the Australian guidelines. Only criteria relevant to Australia have been used in the interpretation of analytical data on the site.

5.0 SITE INSPECTION

5.1 Field Observations

5.1.1 General

The Addendum Study Area included a total of six separate lots, including the Main Northern Rail Line corridor (Lot 4 DP 1191566). In addition, the Addendum Study Area includes RMS land adjacent to the Motorway Link Road and a Crown Road (Nikko Road). A large portion of the Addendum Study Area remains vegetated, with cleared areas utilised for residential/semi-rural purposes, industrial land and transport infrastructure. A summary of the Site Observations is included in **Table 5a** below. The Addendum Study Area was specifically targeted as part of this investigation. Other areas within the identified lots were not considered part of the investigation.

Table 5a General Site Observations – Proposed Alternate Load Out Arrangement

Lot/DP	Address	General Observations
Lot 126 DP755245	91 Tooheys Road Bushells Ridge 2259	Natural soils observed. No imported fill noted. A large portion of Lot 126 DP 755245 is heavily vegetated, with a section cleared adjacent to the entry gate off Tooheys Road. The land is not currently in use and has no evidence of building structures.
Lot 128 DP658436		Evidence of a former residential dwelling and shed is present within vegetated land adjacent to the creek. No building materials were identified. Refer to Print 1 and Print 2 . Lot 128 DP 658436 consists of a parcel of land between Tooheys Road and the Motorway Link Road. A portion of the site has been cleared with a dam present. The land is not currently in use and has no evidence of building structures.
Lot 103 DP755245		A large portion of Lot 103 DP 755245 has also been cleared. Eastern boundary adjoins Boral Quarry fencing. A slab from a previously removed dwelling was located in the south-western portion of this lot. Refer to Print 5 . No fencing present between Lot 102 and Lot 103.

Lot/DP	Address	General Observations
		A small area (approximately 5m ²) of Lot 103 DP 755245 directly adjacent to the entrance gate on Tooheys Road had evidence on the ground surface of automotive material. Refer to Print 6 .
Lot 194 DP1032847	234 Tooheys Road, Bushells Ridge 2259	Natural soils observed. No imported fill noted. The Addendum Study Area occupies the southern portion of Lot 194 DP 1032847 and Lot 168 DP 705480. This area has a series of bunds parallel to the fence line with Tooheys Road. The material utilised for the bunds is presumed to be material from quarrying activities creating a visual barrier onto the site.
Lot 168 DP705480	288 Tooheys Road Bushells Ridge 2259	The land is partially cleared with remnant vegetation observed throughout the corridor portion of Lot 194 and Lot 168. Refer to Print 7 to Print 12 .
	RMS Land Adjacent to Motorway Link Road	Natural soils observed. No imported fill noted. Undisturbed vegetated area. Refer to Print 13 to Print 16 .
Lot 4 DP1191556	Main Northern Railway Line corridor	Fenced area utilised as the Main Northern Rail Line. Imported fills present. Railway ballast throughout the area with service roads and building structures present. Refer to Print 24 to Print 26 . Evidence of weed eradication measures in place.
	Crown Road and land east of the rail corridor	Natural soils observed. No imported fill noted. Southern portion of the site includes an underpass for the Motorway Link Road with public access along the Crown road. Evidence of rubbish and building material present. Several burnt out vehicles also present. A fragment of asbestos containing material (ACM) was found in this location. Refer to Print 17 and Print 18 . The remaining area of the site is predominantly vegetated with several gated access points for the Main Northern Rail Line. There are three creek crossings located within the proposed corridor. Refer to Print 19 to Print 23 .

Refer to **Appendix I** – Print Gallery.

5.1.2 Asbestos

During the Field Investigation conducted by DLA, asbestos was identified within the corridor. The fragments of ACM were located within the section underneath the Motorway Link Road. As this location is easily accessible to the public, there is potential for fragments to be scattered throughout this location. No bulk building waste was observed at the time of Field Investigation.

Refer to **Section 5.5** - Asbestos results.

5.1.3 OffSite Observations

A summary of Off-site Observations is included within **Table 5b** below.

Lot/DP	Address	General Observations
Lot 126 DP755245	91 Tooheys Road Bushells Ridge 2259	Lot 128 DP 658436 – Motorway Link Road to the south, Tooheys Road to the north, Lot 126 DP 755245 to the west and 203 Tooheys Road to the east (vacant land, small portion cleared, outside Addendum Study Area).
Lot 128 DP658436		Lot 126 DP 755245 – Motorway Link Road to the south, Tooheys Road to the north, 77 Tooheys Road to the west (partially cleared, dwelling and sheds on land, outside Addendum Study Area) and Lot 128 to the east.
Lot 103 DP755245	91 Tooheys Road, Bushells Ridge 2259	Tooheys Road to the south, vegetated land to the north, Lot 102 DP 755245 to the west and Boral Montoro quarry to the east.
Lot 194 DP1032847	234 Tooheys Road, Bushells Ridge 2259	Lot 194 DP 1032847 – Tooheys Road to the south, vegetated land to the north, Lot 103 DP 755245 to the west and tile factory and offices to the east.
Lot 168 DP705480	288 Tooheys Road Bushells Ridge 2259	Lot 168 DP 705480 – Tooheys Road to the south, vegetated land to the north, Boral Montoro quarry to the west and Main Northern Rail Line to the east.
	RMS Land Adjacent to Motorway Link Road	Motorway Link Road to the south, tile factory and offices to the north, vegetated land on the quarry site to the west and Main Northern Rail Line to the east.
Lot 4 DP1191556	Main Northern Rail Line corridor	Rail corridor continues to the south and north. Motorway Link Road, RMS land, tile factory and offices and heavily vegetated area to the west. Crown Road, Motorway Link Road and vegetated area to the east.

Lot/DP	Address	General Observations
	Crown Road	Motorway Link Road to the south, densely vegetated area to the north, Main Northern Rail Line to the west and densely vegetated area to the east. A transmission line easement is situated within the northern section of the area and continues on an east-west axis.

5.2 Exposure Pathways

Based on the identified PCOCs, the exposure pathways for use of the land within the Addendum Study Area include:

- Inhalation of PCOCs vapours migrating upwards from fill material of unknown origins or impacted surface soils resulting from potential historical activities; and/or,
- Potential dermal and oral contact to impacted soils in unpaved areas; and,
- Potential contaminant uptake by vegetation within vegetated areas.

5.3 Sensitive Receptors

Sensitive receptors that could be affected if contamination is found to be present within the Addendum Study Area include:

- Present and future workers and users of the site who may potentially be exposed to PCOCs through direct contact with impacted soils and/or inhalation of dusts/vapours associated with impacted soils;
- People who use the surrounding areas for recreational purposes; and
- Maintenance workers conducting activities at the site, who may potentially be exposed to PCOCs through direct contact with impacted soils present in excavations/boreholes and/or inhalation of dusts associated with impacted soils;

6.0 RESULTS

The sampling regime involved the collection of 22 representative surface soil samples which were submitted to SGS Australia Pty Ltd for a range of laboratory analyses. One surface soil sample was collected and submitted to Envirolab Services Pty Ltd for a range of chemical analyses. Eight surface samples were submitted to Australian Safer Environment & Technology (ASET) Pty Ltd for asbestos analyses. Three sediment and three surface water samples were collected and submitted to SGS Australia Pty Ltd for a range of chemical analyses. The results of the assessments conducted within the Addendum Study Area are summarised below:

6.1 Soil Results

6.1.1 Monocyclic Aromatic Hydrocarbons, Volatile Total Recoverable Hydrocarbons and Semi Volatile Total Recoverable Hydrocarbons

Twenty two soil samples were analysed for Volatile Total Recoverable Hydrocarbons (vTRH) and Benzene, Toluene, Ethyl benzene, Xylene and Naphthalene (BTEX). No concentrations of vTRH, BTEX or Naphthalene were recorded above the LOR.

All 22 samples were also analysed for semi-volatile Total Recoverable Hydrocarbon (TRH) compounds. Sample S5-Automotive recorded detections of the F3 (C₁₆-C₃₄) (310 mg/kg) and F4 (C₃₄-C₄₀) (210 mg/kg) hydrocarbon fractions. Sample CR-4 (24/11/15) recorded detections of the F3 (C₁₆-C₃₄) (270 mg/kg) and F4 (C₃₄-C₄₀) (440 mg/kg) hydrocarbon fractions. The concentration of F3 recorded for S5-Automotive (310 mg/kg) marginally exceeded the threshold prescribed by NEPM 2013 (300 mg/kg). The other concentrations of TRH in samples S5-Automotive and CR-4 (24/11/15) were within the thresholds prescribed by NEPM 2013. No other concentrations of semi-volatile TRH compounds were recorded above the LOR. Refer to **Table 6a** below:

Table 6a – TRH Results (mg/kg) – ESL (Coarse)

SAMPLE NAME	ANALYTES								
	Benzene	Toluene	Ethylbenzene	Xylene	Naphthalene	F1 (C ₆ – C ₁₀)	F2 (C ₁₀ – C ₁₆)	F3 (C ₁₆ – C ₃₄)	F4 (C ₃₄ – C ₄₀)
	Threshold Criteria (mg/kg)					180	120	300	2800
	65	105	125	45	170				
S2	ND	ND	ND	ND	ND	ND	ND	ND	ND
S3	ND	ND	ND	ND	ND	ND	ND	ND	ND
S4	ND	ND	ND	ND	ND	ND	ND	ND	ND
S5-AUTOMOTIVE	ND	ND	ND	ND	ND	ND	ND	310	210
CR-1	ND	ND	ND	ND	ND	ND	ND	ND	ND
CR-2	ND	ND	ND	ND	ND	ND	ND	ND	ND
CR-3 (24/11/15)	ND	ND	ND	ND	ND	ND	ND	ND	ND
CR-4 (24/11/15)	ND	ND	ND	ND	ND	ND	ND	270	440
W1	ND	ND	ND	ND	ND	ND	ND	ND	ND
W1A	ND	ND	ND	ND	ND	ND	ND	ND	ND
W1B	ND	ND	ND	ND	ND	ND	ND	ND	ND
W2	ND	ND	ND	ND	ND	ND	ND	ND	ND
CR-3 (08/12/15)	ND	ND	ND	ND	ND	ND	ND	ND	ND
CR-4 (08/12/15)	ND	ND	ND	ND	ND	ND	ND	ND	ND
RC-3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bor-1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bor-1A	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bor-2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bor-5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bor-7	ND	ND	ND	ND	ND	ND	ND	ND	ND
W-3	ND	ND	ND	ND	ND	ND	ND	ND	ND

BOLD = exceedance of the thresholds prescribed by NEPM 2013.

ND = Not Detected above Laboratory LOR

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.1.2 Polycyclic Aromatic Hydrocarbons

Twenty two soil samples were analysed for Polycyclic Aromatic Hydrocarbons (PAH) compounds. Total PAH concentrations were detected above the laboratory LOR in sample S5-Automotive (0.25 mg/kg), however, it was below the threshold prescribed by NEPM 2013 (4,000 mg/kg). No other concentrations of PAHs were recorded above the LOR.

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.1.3 Heavy Metals

Twenty two samples were analysed for all eight heavy metals as recommended by the NSW EPA. Detections were observed for all heavy metals with the exception of Mercury. Sample S5-Automotive recorded a concentration of copper (31,000 mg/kg), exceeding the HIL thresholds (17,000 mg/kg) prescribed by the NEPM 2013. All other concentrations were within the HIL thresholds prescribed by the NEPM (NEPC, 2013) for each respective analyte. Refer to **Table 6c** below:

Table 6c – Heavy Metals Results (mg/kg) – HIL-D

SAMPLE NAME	ANALYTES							
	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	Threshold Criteria (mg/kg)							
	300	90	300	17,000	600	80	1,200	30,000
S2	ND	ND	14	2	12	ND	2	21
S3	ND	ND	3	2	9	ND	1	22
S4	ND	ND	12	ND	7	ND	ND	5
S5-AUTOMOTIVE	ND	ND	19	31,000	200	ND	18	1,900
CR-1	ND	ND	6	3	5	ND	1	22
CR-2	ND	ND	5	6	17	ND	1	45
CR-3 (24/11/15)	6	ND	7	28	67	ND	4	240
CR-4 (24/11/15)	ND	ND	6	45	35	ND	10	71
W1	4	0.3	4.1	22	30	ND	3.8	77
W1A	5	ND	4.2	21	29	ND	4.9	75
W1B	ND	ND	6	19	27	ND	3	67
W2	4	ND	3.6	17	24	ND	4.0	62
CR-3 (08/12/15)	5	ND	3.8	36	41	ND	2.2	220
CR-4 (08/12/15)	5	ND	2.4	18	36	ND	1.0	130
RC-3	6	ND	5.7	53	46	ND	2.7	310
Bor-1	ND	ND	4.6	0.6	6	ND	ND	2.5
Bor-1A	ND	ND	3.2	0.5	4	ND	ND	1.8
Bor-2	ND	ND	5.0	1.3	10	ND	ND	4.5
Bor-5	ND	ND	2.0	0.7	3	ND	ND	1.8
Bor-7	ND	ND	2.1	ND	3	ND	ND	16
W-3	ND	ND	3.3	1.3	7	ND	ND	4.8

BOLD = exceedance of the thresholds prescribed by NEPM 2013.

ND = Not Detected above Laboratory LOR

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.1.4 Pesticides

Twenty one soil samples were analysed for Organochlorine Pesticides (OCP); Organophosphorus Pesticides (OPP) and Polychlorinated Biphenyls (PCBs). No concentrations of OCPs, OPPs or PCBs were recorded above the LOR.

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.2 Asbestos Results

Bulk soil samples were also collected from fill materials throughout the site. These included a sample collected from a bund located within the Boral Montoro Site (sample Bor-3), RMS land adjacent to the Motorway Link Road (MLR) (sample W1 and sample W-2), the entry points into the rail corridor (sample CR-1 and sample RC-3) and on crown land south of the MLR overpass (sample CR-3 (24/11/15) and sample CR-4 (24/11/15)). All bulk soil samples were analysed to contain no detections for asbestos. Visible asbestos was identified during sample collection, on the embankment underneath the Motorway Link Road overpass. Sample CR-FRAG-BANK was identified to contain Chrysotile asbestos in laboratory analysis.

Refer to **Appendix B** – NATA Certified Analytical Results.

6.3 Sediment Results

6.3.1 Monocyclic Aromatic Hydrocarbons, Volatile Total Recoverable Hydrocarbons and Semi Volatile Total Recoverable Hydrocarbons

Three sediment samples were analysed for Volatile Total Recoverable Hydrocarbons (vTRH) and Benzene, Toluene, Ethyl benzene, Xylene and Naphthalene (BTEX). No concentrations of vTRH, BTEX or Naphthalene were recorded above the LOR.

All three samples were also analysed for semi-volatile Total Recoverable Hydrocarbon (TRH) compounds. No concentrations of TRH was recorded above the LOR.

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.3.2 Polycyclic Aromatic Hydrocarbons

Three sediment samples were analysed for Polycyclic Aromatic Hydrocarbons (PAH) compounds. No concentrations of PAHs were recorded above the LOR.

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.3.3 Heavy Metals

Three sediment samples were analysed for all eight heavy metals as recommended by the NSW EPA. Detections were observed for all heavy metals with the exception of Cadmium and Mercury. Sample CR-Sed-1 recorded a concentration of Lead (110 mg/kg), exceeding the Low Risk threshold prescribed by the ANZECC 1992 (50 mg/kg) and a concentration of Zinc (390 mg/kg), exceeding the Low Risk threshold prescribed by the ANZECC 1992 (200 mg/kg). Sample CR-Sed-2 recorded a concentration of lead (62 mg/kg), exceeding the Low Risk thresholds prescribed by the ANZECC 1992 (50 mg/kg) and a concentration of zinc (310 mg/kg), exceeding the Low Risk thresholds prescribed by the ANZECC 1992 (200 mg/kg). These concentrations were, however, within the high risk thresholds requiring management action for Lead (110 mg/kg) and Zinc (410 mg/kg) prescribed by ANZECC 1992. All other concentrations were within the low risk criteria prescribed by ANZECC 1992 for each respective analyte. Refer to **Table 6d**.

Table 6d – Heavy Metals Results (mg/kg) – ANZECC Low and High Risk

SAMPLE NAME	ANALYTES							
	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	Threshold Criteria (mg/kg) – Low Risk							
	20	1.5	80	65	50	0.15	21	200
CR-Sed-1	14	ND	10	38	110	ND	5	390
CR-Sed-2	4	ND	5	22	62	ND	2	310
CR-SED-3	3	ND	3.8	11	14	ND	4.1	53

BOLD = exceedance of the thresholds prescribed by NEPM 2013.

ND = Not Detected above Laboratory LOR

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.3.4 Pesticides

Three sediment samples were analysed for Organochlorine Pesticides (OCP); Organophosphorus Pesticides (OPP) and Polychlorinated Biphenyls (PCBs). No concentrations of OCPs, OPPs or PCBs were recorded above the LOR.

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results

6.4 Surface Water Results

6.4.1 Monocyclic Aromatic Hydrocarbons, Volatile Total Recoverable Hydrocarbons and Semi Volatile Total Recoverable Hydrocarbons

Three surface water samples were analysed for Volatile Total Recoverable Hydrocarbons (vTRH) and Benzene, Toluene, Ethyl benzene, Xylene and Naphthalene (BTEX). No concentrations of vTRH, BTEX or Naphthalene were recorded above the LOR.

All three samples were also analysed for semi-volatile Total Recoverable Hydrocarbon (TRH) compounds. No concentrations of TRH was recorded above the LOR.

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.4.2 Polycyclic Aromatic Hydrocarbons

Three surface water samples were analysed for Polycyclic Aromatic Hydrocarbons (PAH) compounds. No concentrations of PAH's were recorded above the LOR.

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.4.3 Heavy Metals

Three surface water samples were analysed for all eight heavy metals as recommended by the NSW EPA. Detections were observed for all heavy metals with the exception of Cadmium and Mercury. Sample CR1-Water recorded a concentration of Zinc (26 µg/L), which exceeds the GIL thresholds prescribed by the NEPM 2013 (8 µg/L).

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Sample CR2-Water recorded the following exceedances of GIL Thresholds prescribed by the NEPM 2013:

- A concentration of Chromium (2 µg/L), exceeding the GIL thresholds (1.0 µg/L);
- A concentration of Copper (3 µg/L), exceeding the GIL thresholds (1.4 µg/L);
- A concentration of Lead (5 µg/L), exceeding the GIL thresholds (3.4 µg/L); and
- A concentration of Zinc (27 µg/L), exceeding the GIL thresholds (8 µg/L).

Sample CR3-WATER recorded a concentration of Zinc (18 µg/L), exceeding the GIL thresholds (8 µg/L) prescribed by the NEPM 2013. All other concentrations were within the low risk criteria prescribed by ANZECC 1992 for each respective analyte. Refer to **Table 6e** below:

Table 6e – Heavy Metals Results (µg/L) – GIL (Freshwater)

SAMPLE NAME	ANALYTES							
	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold	Threshold
	24	0.2	1.0	1.4	3.4	0.06	11	8
CR1-Water	ND	ND	ND	ND	ND	ND	ND	26
CR2-Water	1	ND	2	3	5	ND	1	27
CR3-Water	ND	ND	ND	ND	ND	ND	ND	18

BOLD = exceedance of the thresholds prescribed by NEPM 2013.

ND = Not Detected above Laboratory LOR

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.4.4 Pesticides

Three surface water samples were analysed for Organochlorine Pesticides (OCP); Organophosphorus Pesticides (OPP) and Polychlorinated Biphenyls (PCBs). No concentrations of OCPs, OPPs or PCBs were recorded above the LOR.

Refer to **Appendix A** – Data Summary Table and **Appendix B** – NATA Certified Analytical Results.

6.5 QA/QC Comments

Laboratory QA/QC on all samples analysed included calculation of %RPD, matrix spike recovery and blank determinations. All matrix spike recovery and blank determinations were within acceptable limits. Therefore, it is considered that sampling techniques and transportation of samples were appropriate. Laboratory Duplicates were tested to ensure the results meet the requirements of QA/QC. The %RPD for the majority of intra-laboratory and inter-laboratory duplicates had concentrations that complied with the criteria set for acceptable RPDs and where exceedances were noted, the heterogeneity observed in the duplicate samples was not deemed significant enough to diminish confidence in the sampling technique or laboratory results. Two additional soil samples were collected during the initial scope of works. Although an intra-laboratory duplicate rate of 9.1% was achieved, less than the 10% required by the Field Quality Plan and an inter-laboratory duplicate rate of 4.5% was achieved, less than the 5% required by the Field Quality Plan, all duplicates indicate compliance with QA/QC.

Refer to **Appendix H** – Quality Assurance and Quality Control.

7.0 DISCUSSION

This CIA Addendum conducted both visual and historical investigations of the Addendum Study Area. This was completed to supplement the Phase 1 CIA for the Project conducted by DLA Environmental in 2013. The potential contaminants of concern for the Addendum Study Area were evaluated. A judgemental soil, sediment and surface water sampling approach was utilised, which involved sampling of areas identified as having a higher potential for anthropogenic influence. The Addendum Study Area, which will contain the alternative load out corridor, was specifically targeted as part of this investigation. Other areas within the identified lots were not considered as part of the investigation.

7.1 Tooheys Road – Rural Land

The field observations and a review of site history information identified potential contaminant sources at two of the properties within the Addendum Study Area. The land within the proposed corridor in this location features former building footprint areas and remnants of chicken farming present at the property identified as 91 Tooheys Road. Automotive waste material was identified adjacent to Tooheys Road at Lot 103 DP 755245.

Soil samples collected from the identified areas were analysed for OC and OP Pesticides, Heavy Metals, Total Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbons associated with the use of pesticides, herbicides, automotive and general waste. Sample S5-Automotive reported a concentration of copper (31,000 mg/kg), exceeding the Site Accepted Criteria (SAC) of 17,000 mg/kg. This is a hotspot in the vicinity of the footprint of the burnt out vehicle. Sample S4 was collected approximately 2.0m from sample S5-Automotive and did not contain any concentrations exceeding the SAC. All other concentrations reported were below the SAC for all analytes examined. No Asbestos Containing Materials (ACM) were identified within soils in this area of the Site. The automotive waste material encountered was isolated to a small location at the entrance gate to Lot 3 DP 755245 and was likely sourced from a burned out vehicle previously on the site.

7.2 Boral Montoro Site

The field observations and a review of site history information identified one potential contaminant source within the Boral Montoro Site. The land within the Addendum Study Area in this location features a series of bunds running parallel to Tooheys Road which appear to be constructed from material produced by quarrying activities.

Soil samples collected from the identified areas were analysed for OC and OP Pesticides, Heavy Metals, Total Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbons associated with the use

of pesticides, herbicides, bulk earthworks, furnace firing and waste disposal. All concentrations reported were below the SAC for all analytes examined. No ACM was identified within soils in this area of the site and the fill material analysed reported no detections for ACM. During the construction phase of the Project, a contaminated land professional should be engaged to ensure the bund material, where there is a need to excavate into the bund, complies with the SAC. The locations requiring investigation will not be known until a footing design for the proposed load out arrangement has been developed.

7.3 RMS Land and Western Side of Rail Corridor

The field observations and a review of site history information identified three potential contaminant sources within the RMS Land and the Western Side of the Rail Corridor. The land within the Addendum Study Area in this location features an embankment of fill material, some general rubbish and building waste and is adjacent to the Main Northern Rail Line.

Soil samples collected from the identified areas were analysed for OC and OP Pesticides, Heavy Metals, Total Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbons associated with the use of pesticides, herbicides, bulk earthworks and waste disposal. All concentrations reported were below the SAC for all analytes examined. No ACM was identified within soils in this area of the site and the fill material analysed reported no detections for ACM.

7.4 Motorway Link Road Overpass Area

The field observations and a review of site history information identified three potential contaminant sources within the Motorway Link Road Overpass area. The land within the proposed corridor in this location includes an access road from the Motorway Link Road and the housing estate to the east. This area is adjacent to the Main Northern Rail Line and has bitumen, building material and general waste within the Addendum Study Area.

Soil samples collected from the identified areas were analysed for OC and OP Pesticides, Heavy Metals, Total Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbons associated with the use of pesticides, herbicides, bulk earthworks, bitumen and waste disposal. All concentrations reported were below the SAC for all analytes examined. One fragment of ACM was found next to the embankment along with some building waste. This material was likely dumped in this location. Several samples of fill material were analysed for asbestos and were reported to have no detections. As the area is isolated and easily accessed by the public there is the potential for the illegal dumping of waste material.

7.5 Crown Road and Area Within and Adjacent to Main Northern Rail Line Corridor

The field observations and a review of site history information identified two potential contaminant sources within the Crown Road and area adjacent to the Main Northern Rail Line. The land within the proposed corridor in this location features a dirt road winding through heavy vegetation. Several motor vehicles have been destroyed by fire and left in this location along with building waste and general waste. As the corridor continues north, there are heavily vegetated pockets of bushland with several access points to the Main Northern Rail Line and three creek crossings.

Soil samples collected from the identified areas were analysed for OC and OP Pesticides, Heavy Metals, Total Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbons associated with the use of pesticides, herbicides, automotive waste, bulk earthworks and waste disposal. All concentrations reported were below the SAC for all analytes examined. No ACM was identified within soils in this area of the site and the fill material analysed reported no detections for ACM. As the area is isolated and easily accessed by the public there is the potential for the illegal dumping of waste material or motor vehicle bodies.

7.6 Spring Creek and Tributaries

The field observations and a review of site history information identified one potential contaminant source within the area of Spring Creek and its tributaries. The creek crossings associated with the proposed infrastructure corridor are adjacent to the Main Northern Rail Line and are intercepted by runoff from within the rail corridor.

Sediment samples collected from the identified areas were analysed for OC and OP Pesticides, Heavy Metals, Total Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbons associated with the use of pesticides, herbicides, bulk earthworks, furnace firing and waste disposal.

Sample CR-Sed-1 reported a concentration of Lead (110 mg/kg), exceeding the Low Risk SAC (50 mg/kg) and equal to the High Risk SAC requiring management action. A concentration of zinc (390 mg/kg), was reported in sample CR-Sed-1 exceeding the Low Risk SAC (200 mg/kg) but within the High Risk SAC (410 mg/kg).

Sample CR-Sed-2 reported a concentration of Lead (62 mg/kg), exceeding the Low Risk SAC (50 mg/kg) and a concentration of Zinc (310 mg/kg), exceeding the Low Risk SAC (200 mg/kg). These concentrations were, however, below the High Risk SAC requiring management action for Lead (110 mg/kg) and Zinc (410 mg/kg).

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All other concentrations reported in samples CR-Sed-1, CR-Sed-2 and CR-Sed-3 were below SAC for all analytes examined. No ACM was identified within the sediment onsite.

Surface water samples collected from Spring Creek and the two tributaries within the Addendum Study Area were analysed for OC and OP Pesticides, Heavy Metals, Total Petroleum Hydrocarbon and Polycyclic Aromatic Hydrocarbons associated with the use of pesticides, herbicides, bulk earthworks, furnace firing and waste disposal. Sample CR1-Water reported a concentration of zinc (2 µg/L), exceeding the SAC (8 µg/L). Sample CR2-Water recorded the following exceedances of the SAC:

- A concentration of Chromium (2 µg/L), exceeding the SAC (1.0 µg/L);
- A concentration of Copper (3 µg/L), exceeding the SAC (1.4 µg/L);
- A concentration of Lead (5 µg/L), exceeding the SAC (3.4 µg/L); and
- A concentration of zinc (27 µg/L), exceeding the SAC (8 µg/L).

Sample CR3-WATER reported a concentration of zinc (18 µg/L), exceeding the SAC (8 µg/L). All other concentrations were within the Low Risk SAC for all analytes examined.

The exceedances of Site Accepted Criteria in Spring Creek and its tributaries are due to historical industrial activities within the catchment area and the area immediately adjacent to the sampling locations. The likely source of this contamination is associated with activities historically conducted within the rail corridor and have been provided to enable the provision of baseline data for the Project.

7.7 Summation of Discussion

Automotive waste material was identified adjacent to Tooheys Road at Lot 103 DP 755245. Sample S5-Automotive reported a concentration of copper (31,000 mg/kg), exceeding the SAC (17,000 mg/kg). This is a hotspot in the vicinity of the footprint of the burnt out vehicle and is not indicative of general conditions within the Addendum Study Area.

One fragment of ACM was found next to the embankment in the Motorway Link Road overpass area along with some building waste. This material was likely dumped in this location.

Sediment samples were collected from Spring Creek and its two tributaries that intercept the site. Sediment sample CR-Sed-1 reported a concentration of Lead (110 mg/kg), exceeding the Low Risk SAC (50 mg/kg) and equal to the High Risk SAC requiring management action. A concentration of Zinc (390 mg/kg), was reported in sample CR-Sed-1 exceeding the Low Risk SAC (200 mg/kg). Sediment sample CR-Sed-2 reported a concentration of Lead (62 mg/kg), exceeding the Low Risk SAC (50 mg/kg) and a concentration of Zinc (310 mg/kg), exceeding the Low Risk SAC (200 mg/kg).

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Surface water samples were collected from Spring Creek and its two tributaries that intercept the site. Sample CR1-Water reported a concentration of Zinc (26 µg/L), exceeding the SAC (8 µg/L). Sample CR2-Water recorded the following exceedances of the SAC:

- A concentration of Chromium (2 µg/L), exceeding the SAC (1.0 µg/L);
- A concentration of Copper (3 µg/L), exceeding the SAC (1.4 µg/L);
- A concentration of Lead (5 µg/L), exceeding the SAC (3.4 µg/L); and
- A concentration of Zinc (27 µg/L), exceeding the SAC (8 µg/L).

Sample CR3-WATER reported a concentration of Zinc (18 µg/L), exceeding the SAC (8 µg/L).

The land within the Addendum Study Area that occupies the Boral Montoro quarry features a series of bunds running parallel to Tooheys Road which appear to be constructed of material from quarrying activities. During the construction phase of the Project, a contaminated land professional should be engaged to ensure the bund material, where there is a need to excavate into the bund, complies with the SAC for the site. The locations requiring investigation will not be known until a footing design for the proposed conveyor system has been developed.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The sampling regime and subsequent assessment and reporting of the site are considered to be adequate for assessment purposes to determine the future land use suitability of the Subject Site in accordance with Wyong Shire Council, relevant Development Consent Conditions and the general requirements of State Environmental Planning Policy No.55 (SEPP 55). All reporting has been undertaken in accordance with the Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA, 2011) and the Guidelines for the NSW Site Auditor Scheme (NSW EPA, 2nd ed., 2006).

With the exception of the identified Heavy Metals concentrations in the automotive waste in Lot 3 DP 755245 and in the sediment and surface water of Spring Creek and its tributaries, there are no indications of chemical contamination by OC and OP pesticides, petroleum hydrocarbons, PAH, or Heavy Metals at the site. Asbestos Containing Materials (ACM) were identified within the Motorway Link Road overpass area in the southeast corner of the site. This area should be monitored if being cleared in the future due to the possibility of the illegal dumping of building, general and automotive waste. The surface water and sediment of Spring Creek and its tributaries should be monitored on a 6 monthly basis, both up-stream and down-stream of the proposed coal load out infrastructure and compared to the baseline data associated with the historical activities in the area.

If excavation of the bund material in the Boral Montoro Site is undertaken in the future, a contaminated land professional should be engaged during the construction phase to ensure the material has been sourced from historical quarrying activities and the material underlain in the bund meets SAC. Furthermore, if any contaminated material is encountered during the construction of the proposed coal load out infrastructure, a contaminated land professional should be engaged to ensure compliance with relevant legislation occurs.

It is therefore the opinion of DLA that the Site assessment objectives of this report have been achieved. The Stage I CIA Addendum concludes that the site is considered suitable for the intended land use consistent with the NEPM (NEPC, 2013) *Commercial Industrial D*, with the exception of the two identified areas. Further, these two areas underneath the Motorway Link Road overpass can be made suitable through the removal of the ACM and the automotive waste hotspot. Following removal, the site will be considered appropriate for its proposed use.

The surface water and sediment of Spring Creek and its tributaries should be monitored on a 6 monthly basis up-stream and down-stream of the proposed coal load out infrastructure to ensure that there is no accelerated mobilisation of any of the existing contaminants identified as a consequence of the construction and operation of the proposed infrastructure in this locality.

The varied project contains less risk from a contamination perspective due to the alternate load out arrangements path in and adjacent to the Main Northern Rail Line. This risk can be managed by monitoring the contamination legacy provided by the Main Northern Rail Line and adherence to the previously mentioned recommendations.

9.0 REFERENCES

- *Australian and New Zealand Guidelines for the Management of Contaminated Sites* (ANZECC/NHMRC 1992);
- Chapman, G A, Murphy, C L, Tille, P J, Atkinson, G and Morse, R J, *Sydney Soil Landscapes Map*, Series 9130 (1989);
- *Code of Practice for the Safe Removal of Asbestos* (NOHSC, 2nd eds, 2005);
- *Contaminated Land Management Act 1997* (NSW);
- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA 2011);
- *Contaminated Sites: Guidelines on Duty to Report Contamination under the Contamination Land Management Act 1997* (NSW DECC, 2009);
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (NSW EPA, 2nd ed., 2006);
- *Contaminated Sites: Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report* (NSW EPA 1999);
- *Contaminated Sites: Sampling Design Guidelines* (NSW EPA 1995);
- *Guidelines for the Assessment of On-Site Containment of Contaminated Soil* (ANZECC, 1999).
- *Health - Based Soil Investigation Levels*, Imray, P & Langley, A, *National Environmental Health Forum Monographs, Soil Series No. 2 (2nd Ed)*, South Australian Health Commission (NEHF 1998b);
- *How to Safely Remove Asbestos: Code of Practice* (WorkCover, 2011);
- *National Environment Protection (Assessment of Site Contamination) Measure (No.1)* (NEPC, 2013);
- *Managing Land Contamination: Planning Guidelines, SEPP 55 - Remediation of Land* (DUAP, 1998);
- *Storage and Handling of Dangerous Goods Code of Practice 2005*;
- Pacific Southwest, Region 9 Regional Screening Levels (US EPA, 2014);
- *Waste Avoidance and Resource Recovery Act 2001* (NSW);
- *Waste Classification Guidelines* (NSW EPA, 2014); and,
- *Work Health and Safety Act 2011* (NSW) and associated regulations.

FIGURE 1 – SITE LOCATION



Approximate Scale
 0m 2500m 5000m

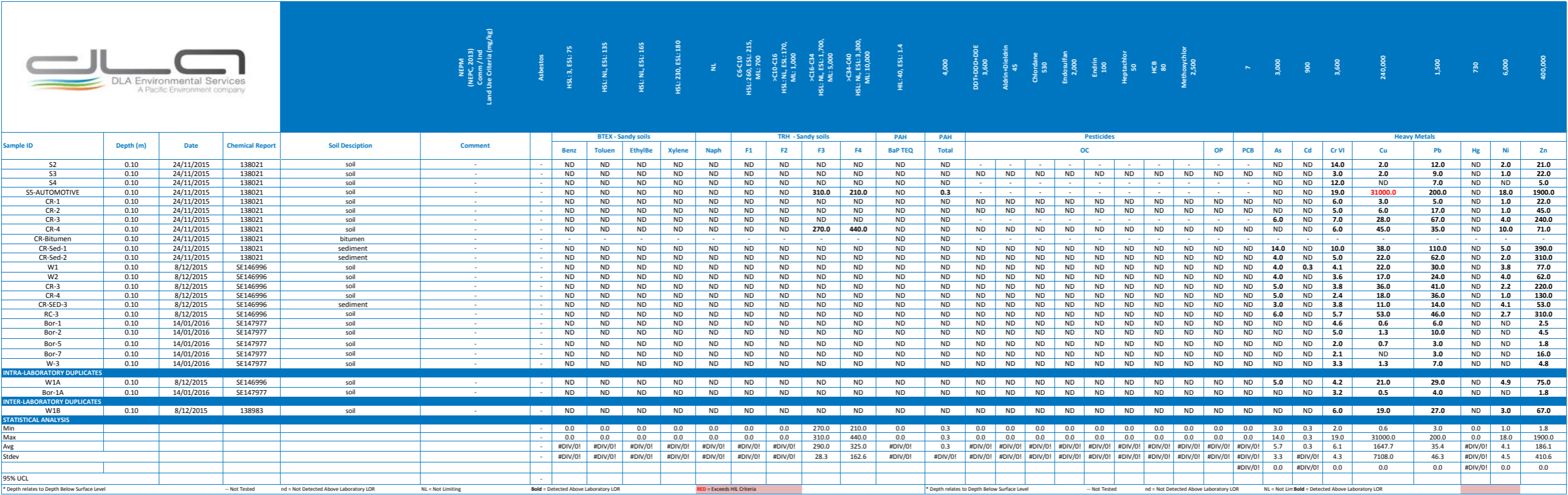
DLA
 DLA Environmental Services
 A Pacific Environment company
 Sydney Office
 Phone (02) 9476 1765
 Fax (02) 9476 1557
 Maitland Office
 Phone (02) 4933 0001

Title Site Location			
Client Hansen Bailey	Project No. DLH1188	Figure No 1	Date 15/01/2016
	Scale As Shown	Compiled JM	Revision R00

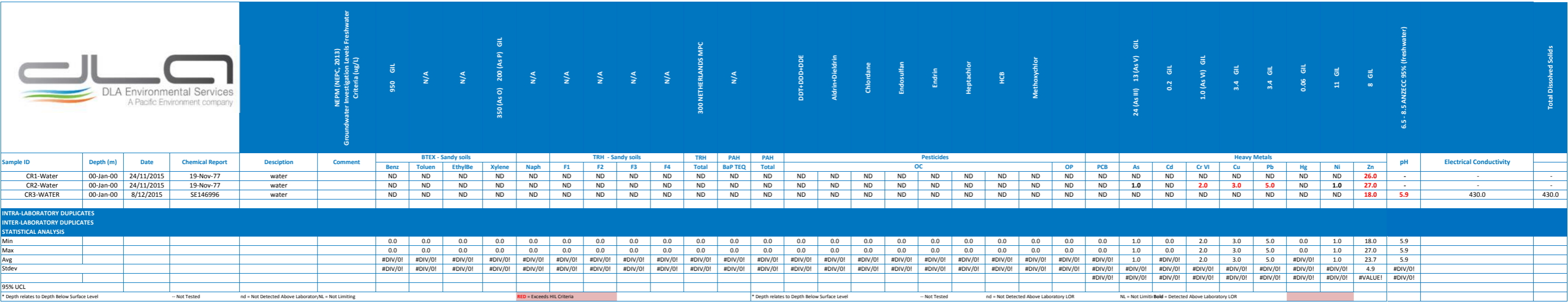
FIGURE 2 – SITE LAYOUT WITH SAMPLING LOCATIONS

APPENDIX A – DATA SUMMARY TABLE


SOILS AND SEDIMENT



WATER



RPD - INORGANIC

 DLA Environmental Services A Pacific Environment company			NEPM (NEPC, 2013) Commercial / Industrial Land Use Criteria (mg/kg)	3,000	900	3,600	240,000	1,500	730	6,000	400,000								
Sample ID	Depth	Date		Report	Heavy Metals														
												As	Cd	Cr	Cu	Pb	Hg	Ni	Zn
INTRA-LABORATORY																			
W1	0.10	8/12/2015	SE146996	4.00	0.30	4.10	22.00	30.00	nd	3.80	77.00								
W1A	0.10	8/12/2015	SE146996	5.00	nd	4.20	21.00	29.00	nd	4.90	75.00								
RPD				22%	#VALUE!	2%	5%	3%	#VALUE!	25%	3%								
Bor-1	0.10	14/01/2016	SE147977	nd	nd	4.60	0.60	6.00	nd	nd	2.50								
Bor-1A	0.10	14/01/2016	SE147977	nd	nd	3.20	0.50	4.00	nd	nd	1.80								
RPD				#VALUE!	#VALUE!	36%	18%	40%	#VALUE!	#VALUE!	33%								
INTER-LABORATORY																			
W1	0.10	8/12/2015	SE146996	4.00	0.30	4.10	22.00	30.00	nd	3.80	77.00								
W1B	0.10	8/12/2015	138983	nd	nd	6.00	19.00	27.00	nd	3.00	67.00								
RPD				#VALUE!	#VALUE!	38%	15%	11%	#VALUE!	24%	14%								
-- Not Tested												nd = Not Detected Above Laboratory LOR							

-- Not Tested

nd = Not Detected Above Laboratory LOR

APPENDIX B – NATA CERTIFIED ANALYTICAL RESULTS

CLIENT DETAILS

Contact Stephen Challinor
Client DLA ENVIRONMENTAL SERVICES PTY LTD
Address 42b Church St
Maitland
NSW 2320

Telephone 61 2 4933 0001
Facsimile 61 2 98700999
Email hunter@dlaenvironmental.com.au

Project **DLH1188 Wallarah**
Order Number (Not specified)
Samples 8

LABORATORY DETAILS

Manager Huong Crawford
Laboratory SGS Alexandria Environmental
Address Unit 16, 33 Maddox St
Alexandria NSW 2015

Telephone +61 2 8594 0400
Facsimile +61 2 8594 0499
Email au.environmental.sydney@sgs.com

SGS Reference **SE146996 R0**
Date Received 10/12/2015
Date Reported 15/12/2015

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES



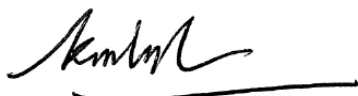
Andy Sutton
Senior Organic Chemist



Dong Liang
Metals/Inorganics Team Leader



Kamrul Ahsan
Senior Chemist



Ly Kim Ha
Organic Section Head

VOC's in Soil [AN433/AN434] Tested: 10/12/2015

PARAMETER	UOM	LOR	W1	W1A	W2	CR-3	CR-4
			SOIL	SOIL	SOIL	SOIL	SOIL
			8/12/2015 SE146996.001	8/12/2015 SE146996.002	8/12/2015 SE146996.003	8/12/2015 SE146996.004	8/12/2015 SE146996.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	CR Sed-3	RC-3
			SEDIMENT	SOIL
			8/12/2015 SE146996.006	8/12/2015 SE146996.007
Benzene	mg/kg	0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3
Total BTEX*	mg/kg	0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433/AN434/AN410] Tested: 10/12/2015

PARAMETER	UOM	LOR	W1	W1A	W2	CR-3	CR-4
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			8/12/2015 SE146996.001	8/12/2015 SE146996.002	8/12/2015 SE146996.003	8/12/2015 SE146996.004	8/12/2015 SE146996.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	CR Sed-3	RC-3
			SEDIMENT	SOIL
			-	-
			8/12/2015 SE146996.006	8/12/2015 SE146996.007
TRH C6-C9	mg/kg	20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 10/12/2015

PARAMETER	UOM	LOR	W1	W1A	W2	CR-3	CR-4
			SOIL - 8/12/2015 SE146996.001	SOIL - 8/12/2015 SE146996.002	SOIL - 8/12/2015 SE146996.003	SOIL - 8/12/2015 SE146996.004	SOIL - 8/12/2015 SE146996.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	CR Sed-3	RC-3
			SEDIMENT - 8/12/2015 SE146996.006	SOIL - 8/12/2015 SE146996.007
TRH C10-C14	mg/kg	20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 10/12/2015

PARAMETER	UOM	LOR	W1	W1A	W2	CR-3	CR-4
			SOIL - 8/12/2015 SE146996.001	SOIL - 8/12/2015 SE146996.002	SOIL - 8/12/2015 SE146996.003	SOIL - 8/12/2015 SE146996.004	SOIL - 8/12/2015 SE146996.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	0.1	0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	CR Sed-3	RC-3
			SEDIMENT - 8/12/2015 SE146996.006	SOIL - 8/12/2015 SE146996.007
Naphthalene	mg/kg	0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	0.2
Anthracene	mg/kg	0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	0.2
Pyrene	mg/kg	0.1	<0.1	0.2
Benzo(a)anthracene	mg/kg	0.1	<0.1	0.1
Chrysene	mg/kg	0.1	<0.1	0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0*	TEQ	0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR*	TEQ (mg/kg)	0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2*	TEQ (mg/kg)	0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8

OC Pesticides in Soil [AN400/AN420] Tested: 10/12/2015

PARAMETER	UOM	LOR	W1	W1A	W2	CR-3	CR-4
			SOIL	SOIL	SOIL	SOIL	SOIL
			8/12/2015 SE146996.001	8/12/2015 SE146996.002	8/12/2015 SE146996.003	8/12/2015 SE146996.004	8/12/2015 SE146996.005
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 10/12/2015 (continued)

PARAMETER	UOM	LOR	CR Sed-3	RC-3
			SEDIMENT - 8/12/2015 SE146996.006	SOIL - 8/12/2015 SE146996.007
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1

PCBs in Soil [AN400/AN420] Tested: 10/12/2015

PARAMETER	UOM	LOR	W1	W1A	W2	CR-3	CR-4
			SOIL	SOIL	SOIL	SOIL	SOIL
			8/12/2015 SE146996.001	8/12/2015 SE146996.002	8/12/2015 SE146996.003	8/12/2015 SE146996.004	8/12/2015 SE146996.005
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	CR Sed-3	RC-3
			SEDIMENT	SOIL
			8/12/2015 SE146996.006	8/12/2015 SE146996.007
Arochlor 1016	mg/kg	0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1

Total Recoverable Metals in Soil by ICPOES [AN040/AN320] Tested: 11/12/2015

PARAMETER	UOM	LOR	W1	W1A	W2	CR-3	CR-4
			SOIL	SOIL	SOIL	SOIL	SOIL
			8/12/2015 SE146996.001	8/12/2015 SE146996.002	8/12/2015 SE146996.003	8/12/2015 SE146996.004	8/12/2015 SE146996.005
Arsenic, As	mg/kg	3	4	5	4	5	5
Cadmium, Cd	mg/kg	0.3	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	4.1	4.2	3.6	3.8	2.4
Copper, Cu	mg/kg	0.5	22	21	17	36	18
Lead, Pb	mg/kg	1	30	29	24	41	36
Nickel, Ni	mg/kg	0.5	3.8	4.9	4.0	2.2	1.0
Zinc, Zn	mg/kg	0.5	77	75	62	220	130

PARAMETER	UOM	LOR	CR Sed-3	RC-3
			SEDIMENT	SOIL
			8/12/2015 SE146996.006	8/12/2015 SE146996.007
Arsenic, As	mg/kg	3	3	6
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	3.8	5.7
Copper, Cu	mg/kg	0.5	11	53
Lead, Pb	mg/kg	1	14	46
Nickel, Ni	mg/kg	0.5	4.1	2.7
Zinc, Zn	mg/kg	0.5	53	310



ANALYTICAL RESULTS

SE146996 R0

Mercury in Soil [AN312] Tested: 11/12/2015

			W1	W1A	W2	CR-3	CR-4
			SOIL - 8/12/2015 SE146996.001	SOIL - 8/12/2015 SE146996.002	SOIL - 8/12/2015 SE146996.003	SOIL - 8/12/2015 SE146996.004	SOIL - 8/12/2015 SE146996.005
PARAMETER	UOM	LOR					
Mercury	mg/kg	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

			CR Sed-3	RC-3
			SEDIMENT - 8/12/2015 SE146996.006	SOIL - 8/12/2015 SE146996.007
PARAMETER	UOM	LOR		
Mercury	mg/kg	0.01	<0.01	<0.01



ANALYTICAL RESULTS

SE146996 R0

Moisture Content [AN002] Tested: 10/12/2015

			W1	W1A	W2	CR-3	CR-4
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			8/12/2015	8/12/2015	8/12/2015	8/12/2015	8/12/2015
PARAMETER	UOM	LOR	SE146996.001	SE146996.002	SE146996.003	SE146996.004	SE146996.005
% Moisture	%w/w	0.5	4.3	4.6	5.9	4.0	1.0

			CR Sed-3	RC-3
			SEDIMENT	SOIL
			-	-
			8/12/2015	8/12/2015
PARAMETER	UOM	LOR	SE146996.006	SE146996.007
% Moisture	%w/w	0.5	37	1.6



ANALYTICAL RESULTS

SE146996 R0

VOCs in Water [AN433/AN434] Tested: 14/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
Benzene	µg/L	0.5	<0.5
Toluene	µg/L	0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5
m/p-xylene	µg/L	1	<1
o-xylene	µg/L	0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5
Total BTEX	µg/L	3	<3
Naphthalene	µg/L	0.5	<0.5



ANALYTICAL RESULTS

SE146996 R0

Volatile Petroleum Hydrocarbons in Water [AN433/AN434/AN410] Tested: 14/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
TRH C6-C9	µg/L	40	<40
Benzene (F0)	µg/L	0.5	<0.5
TRH C6-C10	µg/L	50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50



ANALYTICAL RESULTS

SE146996 R0

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 10/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
TRH C10-C14	µg/L	50	<50
TRH C15-C28	µg/L	200	<200
TRH C29-C36	µg/L	200	<200
TRH C37-C40	µg/L	200	<200
TRH >C10-C16 (F2)	µg/L	60	<60
TRH >C16-C34 (F3)	µg/L	500	<500
TRH >C34-C40 (F4)	µg/L	500	<500
TRH C10-C36	µg/L	450	<450
TRH C10-C40	µg/L	650	<650

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 10/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
Naphthalene	µg/L	0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1
Fluorene	µg/L	0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1
Anthracene	µg/L	0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1
Pyrene	µg/L	0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1
Chrysene	µg/L	0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
Dibenzo(a&h)anthracene	µg/L	0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1
Total PAH (18)	µg/L	1	<1

OC Pesticides in Water [AN400/AN420] Tested: 10/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
Alpha BHC	µg/L	0.1	<0.1
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
Beta BHC	µg/L	0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1
Delta BHC	µg/L	0.1	<0.1
Heptachlor	µg/L	0.1	<0.1
Aldrin	µg/L	0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1
Dieldrin	µg/L	0.1	<0.1
Endrin	µg/L	0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1
Isodrin	µg/L	0.1	<0.1
Mirex	µg/L	0.1	<0.1



ANALYTICAL RESULTS

SE146996 R0

PCBs in Water [AN400/AN420] Tested: 10/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
Arochlor 1016	µg/L	1	<1
Arochlor 1221	µg/L	1	<1
Arochlor 1232	µg/L	1	<1
Arochlor 1242	µg/L	1	<1
Arochlor 1248	µg/L	1	<1
Arochlor 1254	µg/L	1	<1
Arochlor 1260	µg/L	1	<1
Arochlor 1262	µg/L	1	<1
Arochlor 1268	µg/L	1	<1
Total Arochlors*	µg/L	5	<5



ANALYTICAL RESULTS

SE146996 R0

pH in water [AN101] Tested: 10/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
pH**	No unit	-	5.9



ANALYTICAL RESULTS

SE146996 R0

Conductivity and TDS by Calculation - Water [AN106] Tested: 10/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
Conductivity @ 25 C	µS/cm	2	430

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 11/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
Arsenic, As	µg/L	1	<1
Cadmium, Cd	µg/L	0.1	<0.1
Chromium, Cr	µg/L	1	<1
Copper, Cu	µg/L	1	<1
Lead, Pb	µg/L	1	<1
Nickel, Ni	µg/L	1	<1
Zinc, Zn	µg/L	5	18



ANALYTICAL RESULTS

SE146996 R0

Mercury (dissolved) in Water [AN311/AN312] Tested: 14/12/2015

			CR3-Water
			WATER
			-
			8/12/2015
			SE146996.008
PARAMETER	UOM	LOR	
Mercury	mg/L	0.0001	<0.0001

METHOD

METHODOLOGY SUMMARY

- AN002** The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
- AN020** Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
- AN040/AN320** A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
- AN040** A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
- AN101** pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
- AN106** Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Total Dissolved Salts can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. SGS use 0.6. Reference APHA 2510 B.
- AN311/AN312** Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
- AN312** Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
- AN318** Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
- AN400** OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
- AN403** Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
- AN403** Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
- AN403** The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
- AN420** (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
- AN420** SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
- AN433/AN434/AN410** VOCs and C6-C9/C6-C10 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
- AN433/AN434** VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be $1.6 / 2$ (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : [http://www.sgs.com.au/~media/Local/Australia/Documents/ Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf](http://www.sgs.com.au/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf)

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Date Received 15/1/2016
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COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

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VOC's in Soil [AN433/AN434] Tested: 18/1/2016

PARAMETER	UOM	LOR	Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL	SOIL	SOIL	SOIL	SOIL
			14/1/2016 SE147977.001	14/1/2016 SE147977.002	14/1/2016 SE147977.003	14/1/2016 SE147977.004	14/1/2016 SE147977.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	W-3
			SOIL
			14/1/2016 SE147977.006
Benzene	mg/kg	0.1	<0.1
Toluene	mg/kg	0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2
o-xylene	mg/kg	0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433/AN434/AN410] Tested: 18/1/2016

			Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			14/1/2016	14/1/2016	14/1/2016	14/1/2016	14/1/2016
			SE147977.001	SE147977.002	SE147977.003	SE147977.004	SE147977.005
PARAMETER	UOM	LOR					
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

			W-3
			SOIL
			-
			14/1/2016
			SE147977.006
PARAMETER	UOM	LOR	
TRH C6-C9	mg/kg	20	<20
Benzene (F0)	mg/kg	0.1	<0.1
TRH C6-C10	mg/kg	25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 18/1/2016

PARAMETER	UOM	LOR	Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL - 14/1/2016 SE147977.001	SOIL - 14/1/2016 SE147977.002	SOIL - 14/1/2016 SE147977.003	SOIL - 14/1/2016 SE147977.004	SOIL - 14/1/2016 SE147977.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	W-3
			SOIL - 14/1/2016 SE147977.006
TRH C10-C14	mg/kg	20	<20
TRH C15-C28	mg/kg	45	<45
TRH C29-C36	mg/kg	45	<45
TRH C37-C40	mg/kg	100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120
TRH C10-C36 Total	mg/kg	110	<110
TRH C10-C40 Total	mg/kg	210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 18/1/2016

PARAMETER	UOM	LOR	Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL - 14/1/2016 SE147977.001	SOIL - 14/1/2016 SE147977.002	SOIL - 14/1/2016 SE147977.003	SOIL - 14/1/2016 SE147977.004	SOIL - 14/1/2016 SE147977.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	W-3
			SOIL - 14/1/2016 SE147977.006
Naphthalene	mg/kg	0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1
Fluorene	mg/kg	0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1
Anthracene	mg/kg	0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1
Pyrene	mg/kg	0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1
Chrysene	mg/kg	0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8

OC Pesticides in Soil [AN400/AN420] Tested: 18/1/2016

PARAMETER	UOM	LOR	Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL - 14/1/2016 SE147977.001	SOIL - 14/1/2016 SE147977.002	SOIL - 14/1/2016 SE147977.003	SOIL - 14/1/2016 SE147977.004	SOIL - 14/1/2016 SE147977.005
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 18/1/2016 (continued)

			W-3
			SOIL
			-
			14/1/2016
			SE147977.006
PARAMETER	UOM	LOR	
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1
Lindane	mg/kg	0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1
Aldrin	mg/kg	0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2
Endrin	mg/kg	0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1
Isodrin	mg/kg	0.1	<0.1
Mirex	mg/kg	0.1	<0.1

OP Pesticides in Soil [AN400/AN420] Tested: 18/1/2016

PARAMETER	UOM	LOR	Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL	SOIL	SOIL	SOIL	SOIL
			14/1/2016 SE147977.001	14/1/2016 SE147977.002	14/1/2016 SE147977.003	14/1/2016 SE147977.004	14/1/2016 SE147977.005
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2

PARAMETER	UOM	LOR	W-3
			SOIL
			14/1/2016 SE147977.006
Dichlorvos	mg/kg	0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2
Malathion	mg/kg	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2
Methidathion	mg/kg	0.5	<0.5
Ethion	mg/kg	0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2

PCBs in Soil [AN400/AN420] Tested: 18/1/2016

			Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			14/1/2016	14/1/2016	14/1/2016	14/1/2016	14/1/2016
			SE147977.001	SE147977.002	SE147977.003	SE147977.004	SE147977.005
PARAMETER	UOM	LOR					
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

			W-3
			SOIL
			-
			14/1/2016
			SE147977.006
PARAMETER	UOM	LOR	
Arochlor 1016	mg/kg	0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1

Total Recoverable Metals in Soil by ICPOES [AN040/AN320] Tested: 18/1/2016

PARAMETER	UOM	LOR	Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL	SOIL	SOIL	SOIL	SOIL
			14/1/2016 SE147977.001	14/1/2016 SE147977.002	14/1/2016 SE147977.003	14/1/2016 SE147977.004	14/1/2016 SE147977.005
Arsenic, As	mg/kg	3	<3	<3	<3	<3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	4.6	3.2	5.0	2.0	2.1
Copper, Cu	mg/kg	0.5	0.6	0.5	1.3	0.7	<0.5
Lead, Pb	mg/kg	1	6	4	10	3	3
Nickel, Ni	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc, Zn	mg/kg	0.5	2.5	1.8	4.5	1.8	16

PARAMETER	UOM	LOR	W-3
			SOIL
			14/1/2016 SE147977.006
Arsenic, As	mg/kg	3	<3
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.3	3.3
Copper, Cu	mg/kg	0.5	1.3
Lead, Pb	mg/kg	1	7
Nickel, Ni	mg/kg	0.5	<0.5
Zinc, Zn	mg/kg	0.5	4.8

Mercury in Soil [AN312] Tested: 18/1/2016

			Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			14/1/2016	14/1/2016	14/1/2016	14/1/2016	14/1/2016
			SE147977.001	SE147977.002	SE147977.003	SE147977.004	SE147977.005
PARAMETER	UOM	LOR					
Mercury	mg/kg	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

			W-3
			SOIL
			-
			14/1/2016
			SE147977.006
PARAMETER	UOM	LOR	
Mercury	mg/kg	0.01	<0.01



ANALYTICAL RESULTS

SE147977 R0

Moisture Content [AN002] Tested: 18/1/2016

			Bor-1	Bor-1A	Bor-2	Bor-5	Bor-7
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			14/1/2016	14/1/2016	14/1/2016	14/1/2016	14/1/2016
PARAMETER	UOM	LOR	SE147977.001	SE147977.002	SE147977.003	SE147977.004	SE147977.005
% Moisture	%w/w	0.5	5.1	4.2	9.9	16	15

			W-3
			SOIL
			-
			14/1/2016
PARAMETER	UOM	LOR	SE147977.006
% Moisture	%w/w	0.5	17

METHOD

METHODOLOGY SUMMARY

AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434/AN410	VOCs and C6-C9/C6-C10 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
		IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS -SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- 1 Bq is equivalent to 27 pCi
- 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS -SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : <http://www.sgs.com.au/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

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CERTIFICATE OF ANALYSIS

138983

Client:

DLA Environmental Services Pty Ltd (Maitland)
42B Church St
Maitland
NSW 2320

Attention: Stephen Challinor

Sample log in details:

Your Reference:	DLH1188 - Wallarah
No. of samples:	1 soil
Date samples received / completed instructions received	11/12/15 / 11/12/15

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	18/12/15 / 16/12/15
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:


Jacinta Hurst
Laboratory Manager

Envirolab Reference: 138983
Revision No: R 00



vTRH(C6-C10)/BTEXN in Soil		
Our Reference:	UNITS	138983-1
Your Reference	-----	W1-B
Date Sampled	-----	08/12/2015
Type of sample		soil
Date extracted	-	14/12/2015
Date analysed	-	15/12/2015
TRHC ₆ - C ₉	mg/kg	<25
TRHC ₆ - C ₁₀	mg/kg	<25
vTPHC ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	98

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	138983-1
Your Reference	-----	W1-B
Date Sampled	-----	08/12/2015
Type of sample		soil
Date extracted	-	14/12/2015
Date analysed	-	15/12/2015
TRHC ₁₀ - C ₁₄	mg/kg	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100
TRHC ₂₉ - C ₃₆	mg/kg	<100
TRH>C ₁₀ -C ₁₆	mg/kg	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50
TRH>C ₁₆ -C ₃₄	mg/kg	<100
TRH>C ₃₄ -C ₄₀	mg/kg	<100
Surrogate o-Terphenyl	%	89

PAHs in Soil		
Our Reference:	UNITS	138983-1
Your Reference	-----	W1-B
Date Sampled	-----	08/12/2015
Type of sample		soil
Date extracted	-	14/12/2015
Date analysed	-	15/12/2015
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE
Surrogate p-Terphenyl-d14	%	96

Organochlorine Pesticides in soil		
Our Reference:	UNITS	138983-1
Your Reference	-----	W1-B
Date Sampled	-----	08/12/2015
Type of sample		soil
Date extracted	-	14/12/2015
Date analysed	-	14/12/2015
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCMX	%	84

Organophosphorus Pesticides		
Our Reference:	UNITS	138983-1
Your Reference	-----	W1-B
Date Sampled	-----	08/12/2015
Type of sample		soil
Date extracted	-	14/12/2015
Date analysed	-	14/12/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	84

PCBs in Soil	UNITS	138983-1
Our Reference:	-----	W1-B
Your Reference	-----	08/12/2015
Date Sampled		soil
Type of sample		
Date extracted	-	14/12/2015
Date analysed	-	14/12/2015
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Surrogate TCLMX	%	84

Acid Extractable metals in soil		
Our Reference:	UNITS	138983-1
Your Reference	-----	W1-B
Date Sampled	-----	08/12/2015
Type of sample		soil
Date prepared	-	14/12/2015
Date analysed	-	14/12/2015
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	6
Copper	mg/kg	19
Lead	mg/kg	27
Mercury	mg/kg	<0.1
Nickel	mg/kg	3
Zinc	mg/kg	67

Moisture		
Our Reference:	UNITS	138983-1
Your Reference	-----	W1-B
Date Sampled	-----	08/12/2015
Type of sample		soil
Date prepared	-	14/12/2015
Date analysed	-	15/12/2015
Moisture	%	2.9

MethodID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

Client Reference: DLH1188 - Wallarah

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Soil						Base II Duplicate II %RPD		
Date extracted	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
Date analysed	-			15/12/2015	[NT]	[NT]	LCS-2	15/12/2015
TRHC ₆ - C ₉	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-2	108%
TRHC ₆ - C ₁₀	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-2	108%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-2	95%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-2	103%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-2	114%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-2	115%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-2	113%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	101	[NT]	[NT]	LCS-2	104%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH (C10-C40) in Soil						Base II Duplicate II %RPD		
Date extracted	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
Date analysed	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
TRHC ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-2	106%
TRHC ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-2	91%
TRHC ₂₈ - C ₃₆	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-2	80%
TRH>C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-2	106%
TRH>C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-2	91%
TRH>C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-2	80%
Surrogate o-Terphenyl	%		Org-003	83	[NT]	[NT]	LCS-2	111%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Date extracted	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
Date analysed	-			15/12/2015	[NT]	[NT]	LCS-2	15/12/2015
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-2	114%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-2	123%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-2	103%
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-2	104%
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-2	109%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-2	117%
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]

Client Reference: DLH1188 - Wallarah

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	LCS-2	104%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	91	[NT]	[NT]	LCS-2	112%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organochlorine Pesticides in soil						Base II Duplicate II %RPD		
Date extracted	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
Date analysed	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	79%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	76%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	71%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	91%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	90%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	90%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	91%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	94%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	83%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-2	60%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	87	[NT]	[NT]	LCS-2	106%

Client Reference: DLH1188 - Wallarah

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organophosphorus Pesticides						Base II Duplicate II %RPD		
Date extracted	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
Date analysed	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-2	88%
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-2	71%
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-2	99%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-2	91%
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-2	77%
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-2	86%
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-2	95%
Surrogate TCMX	%		Org-008	87	[NT]	[NT]	LCS-2	106%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PCBs in Soil						Base II Duplicate II %RPD		
Date extracted	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
Date analysed	-			14/12/2015	[NT]	[NT]	LCS-2	14/12/2015
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-2	102%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	87	[NT]	[NT]	LCS-2	85%

Client Reference: DLH1188 - Wallarah

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
Date prepared	-			14/12/2015	[NT]	[NT]	LCS-3	14/12/2015
Date analysed	-			14/12/2015	[NT]	[NT]	LCS-3	14/12/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-3	107%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	[NT]	[NT]	LCS-3	101%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	103%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	107%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	101%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-3	104%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	99%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-3	98%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.



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CERTIFICATE OF ANALYSIS

138021

Client:

DLA Environmental Services Pty Ltd (Maitland)

42B Church St

Maitland

NSW 2320

Attention: Stephen Challinor

Sample log in details:

Your Reference:

DLH1188 - Wallarah Addendum

No. of samples:

2 waters 13 soils

Date samples received / completed instructions received

26/11/15 / 26/11/15

This report replaces the R00 due to changes in project's ID.

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:

27/11/15 / 30/11/15

Date of Preliminary Report:

Not Issued

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Accredited for compliance with ISO/IEC 17025.

Tests not covered by NATA are denoted with *.

Results Approved By:


Jacinta Hurst
Laboratory Manager

Envirolab Reference: 138021

Revision No: R 01



vTRH(C6-C10)/BTEXN in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-1 S2 24/11/2015 soil	138021-2 S3 24/11/2015 soil	138021-3 S4 24/11/2015 soil	138021-4 S5- AUTOMOTIVE 24/11/2015 soil	138021-5 CR-1 24/11/2015 soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015	27/11/2015	27/11/2015	27/11/2015
TRHC ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRHC ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPHC ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	103	83	75	81	79

vTRH(C6-C10)/BTEXN in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-6 CR-2 24/11/2015 soil	138021-7 CR-3 24/11/2015 soil	138021-8 CR-4 24/11/2015 soil	138021-10 CR-Sed-1 24/11/2015 soil	138021-11 CR-Sed-2 24/11/2015 soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015	27/11/2015	27/11/2015	27/11/2015
TRHC ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRHC ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPHC ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	73	83	83	71	74

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	138021-14	138021-15
Your Reference	-----	Trip Spike	Trip Blank
Date Sampled	-----	23/11/2015	23/11/2015
Type of sample		soil	soil
Date extracted	-	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015
TRHC ₆ - C ₉	mg/kg	[NA]	<25
TRHC ₆ - C ₁₀	mg/kg	[NA]	<25
vTPHC ₆ - C ₁₀ less BTEX (F1)	mg/kg	[NA]	<25
Benzene	mg/kg	101%	<0.2
Toluene	mg/kg	102%	<0.5
Ethylbenzene	mg/kg	104%	<1
m+p-xylene	mg/kg	104%	<2
o-Xylene	mg/kg	105%	<1
naphthalene	mg/kg	NT	<1
Surrogate aaa-Trifluorotoluene	%	83	85

svTRH (C10-C40) in Soil Our Reference: Your Reference	UNITS -----	138021-1 S2	138021-2 S3	138021-3 S4	138021-4 S5- AUTOMOTIVE	138021-5 CR-1
Date Sampled Type of sample	-----	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015	27/11/2015	27/11/2015	27/11/2015
TRHC ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100	<100	<100	120	<100
TRHC ₂₉ - C ₃₆	mg/kg	<100	<100	<100	280	<100
TRH>C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	310	<100
TRH>C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	210	<100
Surrogate o-Terphenyl	%	79	78	78	82	79

svTRH (C10-C40) in Soil Our Reference: Your Reference	UNITS -----	138021-6 CR-2	138021-7 CR-3	138021-8 CR-4	138021-10 CR-Sed-1	138021-11 CR-Sed-2
Date Sampled Type of sample	-----	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015	27/11/2015	27/11/2015	27/11/2015
TRHC ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRHC ₂₉ - C ₃₆	mg/kg	<100	<100	380	<100	<100
TRH>C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C ₁₆ -C ₃₄	mg/kg	<100	<100	270	<100	<100
TRH>C ₃₄ -C ₄₀	mg/kg	<100	<100	440	<100	<100
Surrogate o-Terphenyl	%	78	84	80	78	77

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	138021-15
Your Reference	-----	TripBlank
Date Sampled	-----	23/11/2015
Type of sample		soil
Date extracted	-	26/11/2015
Date analysed	-	27/11/2015
TRHC ₁₀ - C ₁₄	mg/kg	<50
TRHC ₁₅ - C ₂₈	mg/kg	<100
TRHC ₂₉ - C ₃₆	mg/kg	<100
TRH>C ₁₀ -C ₁₆	mg/kg	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50
TRH>C ₁₆ -C ₃₄	mg/kg	<100
TRH>C ₃₄ -C ₄₀	mg/kg	<100
Surrogate o-Terphenyl	%	76

PAHs in Soil Our Reference: Your Reference	UNITS -----	138021-1 S2	138021-2 S3	138021-3 S4	138021-4 S5- AUTOMOTIVE	138021-5 CR-1
Date Sampled Type of sample	-----	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	0.25	NIL (+)VE
Surrogate p-Terphenyl-d14	%	97	90	94	91	93

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-6 CR-2 24/11/2015 soil	138021-7 CR-3 24/11/2015 soil	138021-8 CR-4 24/11/2015 soil	138021-9 CR-Bitumen 24/11/2015 soil	138021-10 CR-Sed-1 24/11/2015 soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j,k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	93	97	97	88	100

PAHs in Soil		
Our Reference:	UNITS	138021-11
Your Reference	-----	CR-Sed-2
Date Sampled	-----	24/11/2015
Type of sample		soil
Date extracted	-	26/11/2015
Date analysed	-	26/11/2015
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE
Surrogate p-Terphenyl-d14	%	92

Organochlorine Pesticides in soil						
Our Reference:	UNITS	138021-2	138021-5	138021-6	138021-8	138021-10
Your Reference	-----	S3	CR-1	CR-2	CR-4	CR-Sed-1
Date Sampled	-----	24/11/2015	24/11/2015	24/11/2015	24/11/2015	24/11/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	100	105	103	102

Organochlorine Pesticides in soil		
Our Reference:	UNITS	138021-11
Your Reference	-----	CR-Sed-2
Date Sampled	-----	24/11/2015
Type of sample		soil
Date extracted	-	26/11/2015
Date analysed	-	26/11/2015
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCMX	%	101

Organophosphorus Pesticides						
Our Reference:	UNITS	138021-2	138021-5	138021-6	138021-8	138021-10
Your Reference	-----	S3	CR-1	CR-2	CR-4	CR-Sed-1
Date Sampled	-----	24/11/2015	24/11/2015	24/11/2015	24/11/2015	24/11/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	100	105	103	102

Organophosphorus Pesticides		
Our Reference:	UNITS	138021-11
Your Reference	-----	CR-Sed-2
Date Sampled	-----	24/11/2015
Type of sample		soil
Date extracted	-	26/11/2015
Date analysed	-	26/11/2015
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	101

PCBs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-2 S3 24/11/2015 soil	138021-5 CR-1 24/11/2015 soil	138021-6 CR-2 24/11/2015 soil	138021-8 CR-4 24/11/2015 soil	138021-10 CR-Sed-1 24/11/2015 soil
Date extracted	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	106	100	105	103	102

PCBs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-11 CR-Sed-2 24/11/2015 soil
Date extracted	-	26/11/2015
Date analysed	-	26/11/2015
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Surrogate TCLMX	%	101

Acid Extractable metals in soil Our Reference: Your Reference	UNITS -----	138021-1 S2	138021-2 S3	138021-3 S4	138021-4 S5- AUTOMOTIVE	138021-5 CR-1
Date Sampled Type of sample	-----	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil
Date prepared	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	14	3	12	19	6
Copper	mg/kg	2	2	<1	31,000	3
Lead	mg/kg	12	9	7	200	5
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	1	<1	18	1
Zinc	mg/kg	21	22	5	1,900	22

Acid Extractable metals in soil Our Reference: Your Reference	UNITS -----	138021-6 CR-2	138021-7 CR-3	138021-8 CR-4	138021-10 CR-Sed-1	138021-11 CR-Sed-2
Date Sampled Type of sample	-----	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil
Date prepared	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Arsenic	mg/kg	<4	6	<4	14	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	7	6	10	5
Copper	mg/kg	6	28	45	38	22
Lead	mg/kg	17	67	35	110	62
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	4	10	5	2
Zinc	mg/kg	45	240	71	390	310

Moisture Our Reference: Your Reference	UNITS -----	138021-1 S2	138021-2 S3	138021-3 S4	138021-4 S5- AUTOMOTIVE	138021-5 CR-1
Date Sampled Type of sample	-----	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil
Date prepared	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015	27/11/2015	27/11/2015	27/11/2015
Moisture	%	17	9.0	6.7	4.1	12

Moisture Our Reference: Your Reference	UNITS -----	138021-6 CR-2	138021-7 CR-3	138021-8 CR-4	138021-9 CR-Bitumen	138021-10 CR-Sed-1
Date Sampled Type of sample	-----	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil	24/11/2015 soil
Date prepared	-	26/11/2015	26/11/2015	26/11/2015	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015	27/11/2015	27/11/2015	27/11/2015
Moisture	%	13	2.3	2.4	0.2	36

Moisture Our Reference: Your Reference	UNITS -----	138021-11 CR-Sed-2	138021-15 Trip Blank
Date Sampled Type of sample	-----	24/11/2015 soil	23/11/2015 soil
Date prepared	-	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015
Moisture	%	27	0.3

vTRH(C6-C10)/BTEXN in Water			
Our Reference:	UNITS	138021-12	138021-13
Your Reference	-----	CR-1	CR-2
Date Sampled	-----	24/11/2015	24/11/2015
Type of sample		water	water
Date extracted	-	26/11/2015	26/11/2015
Date analysed	-	27/11/2015	27/11/2015
TRHC ₆ - C ₉	µg/L	<10	<10
TRHC ₆ - C ₁₀	µg/L	<10	<10
TRHC ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10
Benzene	µg/L	<1	<1
Toluene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	101	101
Surrogate toluene-d8	%	101	101
Surrogate 4-BFB	%	102	103

svTRH (C10-C40) in Water			
Our Reference:	UNITS	138021-12	138021-13
Your Reference	-----	CR-1	CR-2
Date Sampled	-----	24/11/2015	24/11/2015
Type of sample		water	water
Date extracted	-	27/11/2015	27/11/2015
Date analysed	-	27/11/2015	27/11/2015
TRHC ₁₀ - C ₁₄	µg/L	<50	<50
TRHC ₁₅ - C ₂₈	µg/L	<100	<100
TRHC ₂₉ - C ₃₆	µg/L	<100	<100
TRH>C ₁₀ - C ₁₆	µg/L	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50	<50
TRH>C ₁₆ - C ₃₄	µg/L	<100	<100
TRH>C ₃₄ - C ₄₀	µg/L	<100	<100
Surrogate o-Terphenyl	%	77	80

PAHs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-12 CR-1 24/11/2015 water	138021-13 CR-2 24/11/2015 water
Date extracted	-	27/11/2015	27/11/2015
Date analysed	-	27/11/2015	27/11/2015
Naphthalene	µg/L	<1	<1
Acenaphthylene	µg/L	<1	<1
Acenaphthene	µg/L	<1	<1
Fluorene	µg/L	<1	<1
Phenanthrene	µg/L	<1	<1
Anthracene	µg/L	<1	<1
Fluoranthene	µg/L	<1	<1
Pyrene	µg/L	<1	<1
Benzo(a)anthracene	µg/L	<1	<1
Chrysene	µg/L	<1	<1
Benzo(b,j,k)fluoranthene	µg/L	<2	<2
Benzo(a)pyrene	µg/L	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	91	107

OCP in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-12 CR-1 24/11/2015 water	138021-13 CR-2 24/11/2015 water
Date extracted	-	27/11/2015	27/11/2015
Date analysed	-	27/11/2015	27/11/2015
HCB	µg/L	<0.2	<0.2
alpha-BHC	µg/L	<0.2	<0.2
gamma-BHC	µg/L	<0.2	<0.2
beta-BHC	µg/L	<0.2	<0.2
Heptachlor	µg/L	<0.2	<0.2
delta-BHC	µg/L	<0.2	<0.2
Aldrin	µg/L	<0.2	<0.2
Heptachlor Epoxide	µg/L	<0.2	<0.2
gamma-Chlordane	µg/L	<0.2	<0.2
alpha-Chlordane	µg/L	<0.2	<0.2
Endosulfan I	µg/L	<0.2	<0.2
pp-DDE	µg/L	<0.2	<0.2
Dieldrin	µg/L	<0.2	<0.2
Endrin	µg/L	<0.2	<0.2
pp-DDD	µg/L	<0.2	<0.2
Endosulfan II	µg/L	<0.2	<0.2
pp-DDT	µg/L	<0.2	<0.2
Endrin Aldehyde	µg/L	<0.2	<0.2
Endosulfan Sulphate	µg/L	<0.2	<0.2
Methoxychlor	µg/L	<0.2	<0.2
Surrogate TCMX	%	84	93

OP Pesticides in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-12 CR-1 24/11/2015 water	138021-13 CR-2 24/11/2015 water
Date extracted	-	27/11/2015	27/11/2015
Date analysed	-	27/11/2015	27/11/2015
Azinphos-methyl (Guthion)	µg/L	<0.2	<0.2
Bromophos ethyl	µg/L	<0.2	<0.2
Chlorpyrifos	µg/L	<0.2	<0.2
Chlorpyrifos-methyl	µg/L	<0.2	<0.2
Diazinon	µg/L	<0.2	<0.2
Dichlorovos	µg/L	<0.2	<0.2
Dimethoate	µg/L	<0.2	<0.2
Ethion	µg/L	<0.2	<0.2
Fenitrothion	µg/L	<0.2	<0.2
Malathion	µg/L	<0.2	<0.2
Parathion	µg/L	<0.2	<0.2
Ronnel	µg/L	<0.2	<0.2
Surrogate TCMX	%	84	93

PCBs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	138021-12 CR-1 24/11/2015 water	138021-13 CR-2 24/11/2015 water
Date extracted	-	27/11/2015	27/11/2015
Date analysed	-	27/11/2015	27/11/2015
Aroclor 1016	µg/L	<2	<2
Aroclor 1221	µg/L	<2	<2
Aroclor 1232	µg/L	<2	<2
Aroclor 1242	µg/L	<2	<2
Aroclor 1248	µg/L	<2	<2
Aroclor 1254	µg/L	<2	<2
Aroclor 1260	µg/L	<2	<2
Surrogate TCLMX	%	84	93

HM in water - dissolved			
Our Reference:	UNITS	138021-12	138021-13
Your Reference	-----	CR-1	CR-2
Date Sampled	-----	24/11/2015	24/11/2015
Type of sample		water	water
Date prepared	-	26/11/2015	26/11/2015
Date analysed	-	26/11/2015	26/11/2015
Arsenic-Dissolved	µg/L	<1	1
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	2
Copper-Dissolved	µg/L	<1	3
Lead-Dissolved	µg/L	<1	5
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	<1	1
Zinc-Dissolved	µg/L	26	27

MethodID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.

Client Reference: DLH1188 - Wallarah Addendum

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Soil						Base II Duplicate II %RPD		
Date extracted	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Date analysed	-			27/11/2015	138021-2	27/11/2015 27/11/2015	LCS-3	27/11/2015
TRHC ₆ - C ₉	mg/kg	25	Org-016	<25	138021-2	<25 <25	LCS-3	103%
TRHC ₆ - C ₁₀	mg/kg	25	Org-016	<25	138021-2	<25 <25	LCS-3	103%
Benzene	mg/kg	0.2	Org-016	<0.2	138021-2	<0.2 <0.2	LCS-3	103%
Toluene	mg/kg	0.5	Org-016	<0.5	138021-2	<0.5 <0.5	LCS-3	103%
Ethylbenzene	mg/kg	1	Org-016	<1	138021-2	<1 <1	LCS-3	102%
m+p-xylene	mg/kg	2	Org-016	<2	138021-2	<2 <2	LCS-3	103%
o-Xylene	mg/kg	1	Org-016	<1	138021-2	<1 <1	LCS-3	103%
naphthalene	mg/kg	1	Org-014	<1	138021-2	<1 <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	104	138021-2	83 106 RPD: 24	LCS-3	106%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH (C10-C40) in Soil						Base II Duplicate II %RPD		
Date extracted	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Date analysed	-			27/11/2015	138021-2	27/11/2015 27/11/2015	LCS-3	27/11/2015
TRHC ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	138021-2	<50 <50	LCS-3	102%
TRHC ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	138021-2	<100 <100	LCS-3	88%
TRHC ₂₈ - C ₃₆	mg/kg	100	Org-003	<100	138021-2	<100 <100	LCS-3	93%
TRH>C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	138021-2	<50 <50	LCS-3	102%
TRH>C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	138021-2	<100 <100	LCS-3	88%
TRH>C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	138021-2	<100 <100	LCS-3	93%
Surrogate o-Terphenyl	%		Org-003	77	138021-2	78 79 RPD: 1	LCS-3	119%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Date extracted	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Date analysed	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Naphthalene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	LCS-3	111%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	LCS-3	116%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	LCS-3	98%
Anthracene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	LCS-3	101%
Pyrene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	LCS-3	106%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	LCS-3	118%
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	138021-2	<0.2 <0.2	[NR]	[NR]

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QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	138021-2	<0.05 <0.05	LCS-3	100%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	94	138021-2	90 95 RPD: 5	LCS-3	93%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organochlorine Pesticides in soil						Base II Duplicate II %RPD		
Date extracted	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Date analysed	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
HCB	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	115%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Heptachlor	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	105%
delta-BHC	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	108%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	98%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	94%
Dieldrin	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	93%
Endrin	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	113%
pp-DDD	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	109%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	LCS-3	110%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	102	138021-2	106 100 RPD: 6	LCS-3	101%

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QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Organophosphorus Pesticides						Base II Duplicate II %RPD		
Date extracted	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Date analysed	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Chlorpyrifos	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	LCS-3	100%
Chlorpyrifos-methyl	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	LCS-3	128%
Dimethoate	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	LCS-3	79%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	LCS-3	112%
Malathion	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	LCS-3	76%
Parathion	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	LCS-3	107%
Ronnel	mg/kg	0.1	Org-008	<0.1	138021-2	<0.1 <0.1	LCS-3	91%
Surrogate TCMX	%		Org-008	102	138021-2	106 100 RPD: 6	LCS-3	96%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PCBs in Soil						Base II Duplicate II %RPD		
Date extracted	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Date analysed	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-3	26/11/2015
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	138021-2	<0.1 <0.1	LCS-3	95%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	138021-2	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	102	138021-2	106 100 RPD: 6	LCS-3	83%

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QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
Date prepared	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-7	26/11/2015
Date analysed	-			26/11/2015	138021-2	26/11/2015 26/11/2015	LCS-7	26/11/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	138021-2	<4 <4	LCS-7	109%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	138021-2	<0.4 <0.4	LCS-7	108%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	138021-2	3 3 RPD: 0	LCS-7	109%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	138021-2	2 2 RPD: 0	LCS-7	112%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	138021-2	9 7 RPD: 25	LCS-7	110%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	138021-2	<0.1 <0.1	LCS-7	108%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	138021-2	1 <1	LCS-7	105%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	138021-2	22 23 RPD: 4	LCS-7	108%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Water						Base II Duplicate II %RPD		
Date extracted	-			26/11/2015	[NT]	[NT]	LCS-W1	26/11/2015
Date analysed	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
TRHC ₆ - C ₉	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	103%
TRHC ₆ - C ₁₀	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	103%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	103%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	103%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	102%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	103%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	103%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	100	[NT]	[NT]	LCS-W1	99%
Surrogate toluene-d8	%		Org-016	100	[NT]	[NT]	LCS-W1	100%
Surrogate 4-BFB	%		Org-016	103	[NT]	[NT]	LCS-W1	102%

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QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH (C10-C40) in Water						Base II Duplicate II %RPD		
Date extracted	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
Date analysed	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
TRHC ₁₀ - C ₁₄	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	89%
TRHC ₁₅ - C ₂₈	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	78%
TRHC ₂₈ - C ₃₆	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	93%
TRH>C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	89%
TRH>C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	78%
TRH>C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	89%
Surrogate o-Terphenyl	%		Org-003	68	[NT]	[NT]	LCS-W1	90%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Water						Base II Duplicate II %RPD		
Date extracted	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
Date analysed	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
Naphthalene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	84%
Acenaphthylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	87%
Phenanthrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	76%
Anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	76%
Pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	80%
Benzo(a)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	91%
Benzo(b,j,k)fluoranthene	µg/L	2	Org-012	<2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	98%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	107	[NT]	[NT]	LCS-W1	94%

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QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
OCP in water						Base II Duplicate II %RPD		
Date extracted	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
Date analysed	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
HCB	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
alpha-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	96%
gamma-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
beta-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	87%
Heptachlor	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	83%
delta-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Aldrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	101%
Heptachlor Epoxide	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	99%
gamma-Chlordane	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
alpha-Chlordane	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Endosulfan I	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
pp-DDE	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	96%
Dieldrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	97%
Endrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	105%
pp-DDD	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	93%
Endosulfan II	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
pp-DDT	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	97%
Methoxychlor	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	89	[NT]	[NT]	LCS-W1	87%

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QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
OP Pesticides in water						Base II Duplicate II %RPD		
Date extracted	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
Date analysed	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
Azinphos-methyl (Guthion)	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Bromophos ethyl	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Chlorpyrifos	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	74%
Chlorpyrifos-methyl	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Diazinon	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Dichlorvos	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	81%
Dimethoate	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Ethion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	84%
Fenitrothion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	99%
Malathion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	86%
Parathion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	98%
Ronnel	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	85%
Surrogate TCMX	%		Org-008	89	[NT]	[NT]	LCS-W1	87%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PCBs in Water						Base II Duplicate II %RPD		
Date extracted	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
Date analysed	-			27/11/2015	[NT]	[NT]	LCS-W1	27/11/2015
Aroclor 1016	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	µg/L	2	Org-006	<2	[NT]	[NT]	LCS-W1	100%
Aroclor 1260	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	89	[NT]	[NT]	LCS-W1	87%

Client Reference: DLH1188 - Wallarah Addendum

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
HM in water - dissolved						Base Duplicate %RPD		
Date prepared	-			26/11/2015	[NT]	[NT]	LCS-3	26/11/2015
Date analysed	-			26/11/2015	[NT]	[NT]	LCS-3	26/11/2015
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-3	92%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-3	96%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-3	86%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-3	91%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-3	94%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-3	96%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-3	90%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-3	92%
QUALITYCONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#		Duplicate Base + Duplicate + %RPD		Spike Sm#	Spike % Recovery	
Date extracted	-	138021-11		26/11/2015 26/11/2015		138021-5	26/11/2015	
Date analysed	-	138021-11		27/11/2015 27/11/2015		138021-5	27/11/2015	
TRHC ₆ - C ₉	mg/kg	138021-11		<25 <25		138021-5	102%	
TRHC ₆ - C ₁₀	mg/kg	138021-11		<25 <25		138021-5	102%	
Benzene	mg/kg	138021-11		<0.2 <0.2		138021-5	92%	
Toluene	mg/kg	138021-11		<0.5 <0.5		138021-5	99%	
Ethylbenzene	mg/kg	138021-11		<1 <1		138021-5	105%	
m+p-xylene	mg/kg	138021-11		<2 <2		138021-5	107%	
o-Xylene	mg/kg	138021-11		<1 <1		138021-5	106%	
naphthalene	mg/kg	138021-11		<1 <1		[NR]	[NR]	
Surrogate aaa-Trifluorotoluene	%	138021-11		74 70 RPD: 6		138021-5	77%	

Client Reference: DLH1188 - Wallarah Addendum

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Date analysed	-	138021-11	27/11/2015 27/11/2015	138021-5	27/11/2015
TRHC ₁₀ - C ₁₄	mg/kg	138021-11	<50 <50	138021-5	96%
TRHC ₁₅ - C ₂₈	mg/kg	138021-11	<100 <100	138021-5	83%
TRHC ₂₉ - C ₃₆	mg/kg	138021-11	<100 <100	138021-5	#
TRH>C ₁₀ -C ₁₆	mg/kg	138021-11	<50 <50	138021-5	96%
TRH>C ₁₆ -C ₃₄	mg/kg	138021-11	<100 <100	138021-5	83%
TRH>C ₃₄ -C ₄₀	mg/kg	138021-11	<100 <100	138021-5	#
Surrogate o-Terphenyl	%	138021-11	77 77 RPD: 0	138021-5	79%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Date analysed	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Naphthalene	mg/kg	138021-11	<0.1 <0.1	138021-5	108%
Acenaphthylene	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Acenaphthene	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Fluorene	mg/kg	138021-11	<0.1 <0.1	138021-5	114%
Phenanthrene	mg/kg	138021-11	<0.1 <0.1	138021-5	97%
Anthracene	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Fluoranthene	mg/kg	138021-11	<0.1 <0.1	138021-5	98%
Pyrene	mg/kg	138021-11	<0.1 <0.1	138021-5	102%
Benzo(a)anthracene	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Chrysene	mg/kg	138021-11	<0.1 <0.1	138021-5	115%
Benzo(b,j,k)fluoranthene	mg/kg	138021-11	<0.2 <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	138021-11	<0.05 <0.05	138021-5	95%
Indeno(1,2,3-c,d)pyrene	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	138021-11	92 94 RPD: 2	138021-5	92%

Client Reference: DLH1188 - Wallarah Addendum

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Date analysed	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
HCB	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
alpha-BHC	mg/kg	138021-11	<0.1 <0.1	138021-5	110%
gamma-BHC	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
beta-BHC	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Heptachlor	mg/kg	138021-11	<0.1 <0.1	138021-5	99%
delta-BHC	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Aldrin	mg/kg	138021-11	<0.1 <0.1	138021-5	102%
Heptachlor Epoxide	mg/kg	138021-11	<0.1 <0.1	138021-5	92%
gamma-Chlordane	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Endosulfan I	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
pp-DDE	mg/kg	138021-11	<0.1 <0.1	138021-5	87%
Dieldrin	mg/kg	138021-11	<0.1 <0.1	138021-5	87%
Endrin	mg/kg	138021-11	<0.1 <0.1	138021-5	106%
pp-DDD	mg/kg	138021-11	<0.1 <0.1	138021-5	89%
Endosulfan II	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
pp-DDT	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	138021-11	<0.1 <0.1	138021-5	102%
Methoxychlor	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Surrogate TCMX	%	138021-11	101 107 RPD: 6	138021-5	98%

Client Reference: DLH1188 - Wallarah Addendum

QUALITYCONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Date analysed	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Azinphos-methyl (Guthion)	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	138021-11	<0.1 <0.1	138021-5	105%
Chlorpyriphos-methyl	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Diazinon	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Dichlorvos	mg/kg	138021-11	<0.1 <0.1	138021-5	123%
Dimethoate	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Ethion	mg/kg	138021-11	<0.1 <0.1	138021-5	75%
Fenitrothion	mg/kg	138021-11	<0.1 <0.1	138021-5	105%
Malathion	mg/kg	138021-11	<0.1 <0.1	138021-5	72%
Parathion	mg/kg	138021-11	<0.1 <0.1	138021-5	107%
Ronnel	mg/kg	138021-11	<0.1 <0.1	138021-5	89%
Surrogate TCMX	%	138021-11	101 107 RPD: 6	138021-5	99%
QUALITYCONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Date analysed	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Aroclor 1016	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	138021-11	<0.1 <0.1	138021-5	98%
Aroclor 1260	mg/kg	138021-11	<0.1 <0.1	[NR]	[NR]
Surrogate TCLMX	%	138021-11	101 107 RPD: 6	138021-5	85%
QUALITYCONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Date analysed	-	138021-11	26/11/2015 26/11/2015	138021-5	26/11/2015
Arsenic	mg/kg	138021-11	4 8 RPD: 67	138021-5	92%
Cadmium	mg/kg	138021-11	<0.4 <0.4	138021-5	107%
Chromium	mg/kg	138021-11	5 6 RPD: 18	138021-5	105%
Copper	mg/kg	138021-11	22 26 RPD: 17	138021-5	107%
Lead	mg/kg	138021-11	62 79 RPD: 24	138021-5	106%
Mercury	mg/kg	138021-11	<0.1 <0.1	138021-5	95%
Nickel	mg/kg	138021-11	2 2 RPD: 0	138021-5	103%
Zinc	mg/kg	138021-11	310 280 RPD: 10	138021-5	109%

Report Comments:

TRH_S(semi vol):# Percent recovery is not possible to report due to interference from analytes (other than those being tested) in the sample/s.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test

NR: Test not required

<: Less than

PQL: Practical Quantitation Limit

RPD: Relative Percent Difference

>: Greater than

NT: Not tested

NA: Test not required

LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.



AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

ABN 36 088 095 112

Our ref : ASET47594/ 50774 / 1 - 3
Your ref : DLH1188 – Wallarah Coal
NATA Accreditation No: 14484

26 November 2015

DLA Environmental Services Pty Ltd
3/38 Leighton Place
Hornsby NSW 2077

Attn: Mr David Lane

Dear David

Asbestos Identification

This report presents the results of three samples, forwarded by DLA Environmental Services Pty Ltd on 26 November 2015, for analysis for asbestos.

1.Introduction:Three samples forwarded were examined and analysed for the presence of asbestos.

2. Methods : The samples were examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining method (**Australian Standard AS 4964 - 2004 and Safer Environment Method 1 as the supplementary work instruction**) (**Qualitative Analysis only**).

The report also provides approximate weights and percentages, categories of asbestos forms appearing in the sample, such as **AF**(Asbestos Fines), **FA**(Friable Asbestos and **ACM** (Asbestos Containing Material), also satisfying the requirements of the WA/ NEPM Guidelines)

3. Results : **Sample No. 1. ASET47594 / 50774 / 1. CR - 1.**
Approx dimensions 11.0 cm x 11.0 cm x 6.5 cm
Approx total weight of soil = 808.0g
The sample consisted of a mixture of clayish soil, stones, plant matter and fragments of plaster.
No asbestos detected.

Sample No. 2. ASET47594 / 50774 / 2. CR - 3.
Approx dimensions 11.0 cm x 10.0 cm x 6.7 cm
Approx total weight of soil = 793.0g
The sample consisted of a mixture of clayish soil, stones, plant matter and fragments of plaster.
No asbestos detected.

SUITE 710 / 90 GEORGE STREET, HORNSBY NSW 2077 – P.O. BOX 1644 HORNSBY WESTFIELD NSW 1635
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Sample No. 3. ASET47594 / 50774 / 3. CR - 4.

Approx dimensions 10.0 cm x 10.0 cm x 5.7 cm

Approx total weight of soil = 603.0g

The sample consisted of a mixture of clayish sandy soil, stones , plant matter, fragments of cement and plaster.

No asbestos detected.

Analysed and reported by,



Chamath Annakkage. BSc
Environmental Technician/Approved Identifier



Nisansala Maddage. BSc(Hons)
Environmental Scientist/ Approved Signatory



Accredited for compliance with ISO/IEC 17025.

This report is consistent with the analytical procedures and reporting recommendations in the Western Australia Guidelines for the Assessment Remediation and Management of Asbestos contaminated sites in Western Australia and it also satisfies the requirements of the current NEPM Guidelines. NATA Accreditation does not cover the performance of this service (NATA ISO/IEC17025 AUG 2014).

Disclaimers;

The approx; weights given above can be used only as a guide. They do not represent absolute weights of each kind of asbestos, as it is impossible to extract all loose fibres from soil and other asbestos containing building material samples using this method. However above figures may be used as closest approximations to the exact values in each case. Estimation and/ or reporting of asbestos fibre weights in asbestos containing materials and soil is out of the Scope of the NATA Accreditation. NATA Accreditation only covers the qualitative part of the results reported. This weight disclaimer also covers weight / weight percentages given.

ACM - Asbestos Containing Material - Products or materials that contain asbestos in an inert bound matrix such as cement or resin. Here taken to be sound material, even as fragments and not fitting through a 7mm X 7 mm sieve.

AF -Includes asbestos free fibres, small fibre bundles and also ACM fragments that pass through a 7mm X 7 mm sieve.

FA -Friable asbestos material such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products.

^ denotes loose fibres of relevant asbestos types detected in soil/dust and fragments of ACM smaller than 7mm diameter.

*** denotes asbestos detected in ACM in bonded form.**

denotes FA.

All samples indicating "No asbestos detected" are assumed to be less than 0.001 % unless the actual approximate weight is given.



AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

ABN 36 088 095 112

Our ref : ASET47595/ 50775 / 1 - 1
Your ref : DLH1188 – Wallarah Coal
NATA Accreditation No: 14484

26 November 2015

DLA Environmental Services Pty Ltd
3/38 Leighton Place
Hornsby NSW 2077

Attn: Mr David Lane

Dear David

Asbestos Identification

This report presents the results of one sample, forwarded by DLA Environmental Services Pty Ltd on 26 November 2015, for analysis for asbestos.

1.Introduction: One sample forwarded were examined and analysed for the presence of asbestos.

2. Methods : The sample was examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining method (**Australian Standard AS4964 - 2004 and Safer Environment Method 1 as the supplementary work instruction**) (**Qualitative Analysis only**).

3. Results : **Sample No. 1. ASET47595 / 50775 / 1. CR – Frag - Bank.**
Approx dimensions 13.0 cm x 12.0 cm x 0.5 cm
The sample consisted of a fragment of a fibro plaster cement material.
Chrysotile (Estimated approximate weight = 10.24g) asbestos detected.
Estimated approximate total weight of asbestos in ACM = 10.24 g
Approximate total weight of ACM = 128.0g
Estimated approximate w/w % = 8.0%

Analysed and reported by,

Chamath Annakkage. BSc
Environmental Technician/Approved Identifier

Nisansala Maddage. BSc(Hons)
Environmental Scientist/ Approved Signatory



Accredited for compliance with ISO/IEC 17025.

Disclaimers;

The approx; weights given above can be used only as a guide. They do not represent absolute weights of each kind of asbestos, as it is impossible to extract all loose fibres from soil and other asbestos containing building material samples using this method. However above figures may be used as closest approximations to the exact values in each case. Estimation and/ or reporting of asbestos fibre weights in asbestos containing materials and soil is out of the Scope of the NATA Accreditation. NATA

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Accreditation only covers the qualitative part of the results reported. This weight disclaimer also covers weight / weight percentages given.

ACM - Asbestos Containing Material - Products or materials that contain asbestos in an inert bound matrix such as cement or resin.

AS4964 – 2004 specifies a detection limit / reporting limit of 0.01%

The results contained in this report relate only to the sample/s submitted for testing. Australian Safer Environment & Technology accepts no responsibility for whether or not the submitted sample/s is/are representative.



AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

ABN 36 088 095 112

Our ref : ASET47847/ 51027 / 1 - 3

Your ref : DLH1188

NATA Accreditation No: 14484

11 December 2015

DLA Environmental Services Pty Ltd
42B Church Street
Maitland NSW 2320

Attn: Mr David Lane

Dear David

Asbestos Identification

This report presents the results of three samples, forwarded by DLA Environmental Services Pty Ltd on 10 December 2015, for analysis for asbestos.

1.Introduction: Three samples forwarded were examined and analysed for the presence of asbestos.

2. Methods : The samples were examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining method (**Australian Standard AS 4964 - 2004 and Safer Environment Method 1 as the supplementary work instruction**) (Qualitative Analysis only).

3. Results : **Sample No. 1. ASET47847 / 51027 / 1. W1.**
Approx dimensions 13.01 cm x 13.0 cm x 5.5 cm
The sample consisted of a mixture of soil, stones, plant matter, fragments of plaster, cement and corroded metal.
No asbestos detected.

Sample No. 2. ASET47847 / 51027 / 2. W2.
Approx dimensions 13.0 cm x 13.0 cm x 6.0 cm
The sample consisted of a mixture of soil, stones, plant matter, fragments of plaster, cement and corroded metal.
No asbestos detected.

Sample No. 3. ASET47847 / 51027 / 3. RC-3.
Approx dimensions 10.0 cm x 10.0 cm x 5.0 cm
The sample consisted of a mixture of soil, stones, plant matter, fragments of plaster and cement.
No asbestos detected.

Analysed and reported by,

Nisansala Maddage. BSc(Hons)
Environmental Scientist/Approved Identifier
Approved Signatory



Accredited for compliance with ISO/IEC 17025.

The results contained in this report relate only to the sample/s submitted for testing. Australian Safer Environment & Technology accepts no responsibility for whether or not the submitted sample/s is/are representative.

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AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

ABN 36 088 095 112

Our ref: ASET48355 / 51535 / 1 - 1
Your ref : DLH1188 - Wallarah Coal
NATA Accreditation No: 14484

21 January 2016

DLA Environmental Services Pty Ltd
42B Church Street
Maitland NSW 2320

Attn: Mr David Lane

Dear David

Asbestos Identification

This report presents the results of one sample, forwarded by DLA Environmental Services Pty Ltd on 20 January 2016, for analysis for asbestos.

1.Introduction: One sample forwarded was examined and analysed for the presence of asbestos.

2. Methods : The sample was examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining method (Australian Standard AS 4964 - 2004 and Safer Environment Method 1 as the supplementary work instruction) (Qualitative Analysis only).

The report also provides approximate weights and percentages, categories of asbestos forms appearing in the sample, such as **AF**(Asbestos Fines), **FA**(Friable Asbestos and **ACM** (Asbestos Containing Material), also satisfying the requirements of the WA/ NEPM Guidelines)

3. Results : **Sample No. 1. ASET48355 / 51535 / 1. BOR - 3.**
Approx dimensions 12.0 cm x 12.0 cm x 4.5 cm
Approximate total dry weight of soil = 707.0g
The sample consisted of a mixture of clayish soil, stones, plant matter, fragments of plaster and cement.
No asbestos detected.

Analysed and reported by,

Nisansala Maddage. BSc(Hons)
Environmental Scientist/Approved Identifier
Approved Signatory



**WORLD RECOGNISED
ACCREDITATION**

Accredited for compliance with ISO/IEC 17025.

SUITE 710 / 90 GEORGE STREET, HORNSBY NSW 2077 – P.O. BOX 1644 HORNSBY WESTFIELD NSW 1635
PHONE: (02) 99872183 FAX: (02)99872151 EMAIL: info@ausset.com.au WEBSITE: www.Ausset.com.au

OCCUPATIONAL HEALTH & SAFETY STUDIES • INDOOR AIR QUALITY SURVEYS • HAZARDOUS MATERIAL SURVEYS • RADIATION SURVEYS • ASBESTOS SURVEYS
ASBESTOS DETECTION & IDENTIFICATION • REPAIR & CALIBRATION OF SCIENTIFIC EQUIPMENT • AIRBORNE FIBRE & SILICA MONITORING



This report is consistent with the analytical procedures and reporting recommendations in the Western Australia Guidelines for the Assessment Remediation and Management of Asbestos contaminated sites in Western Australia and it also satisfies the requirements of the current NEPM Guidelines. NATA Accreditation does not cover the performance of this service (NATA ISO/IEC17025 AUG 2014).

Disclaimers;

The approx; weights given above can be used only as a guide. They do not represent absolute weights of each kind of asbestos, as it is impossible to extract all loose fibres from soil and other asbestos containing building material samples using this method. However above figures may be used as closest approximations to the exact values in each case. Estimation and/ or reporting of asbestos fibre weights in asbestos containing materials and soil is out of the Scope of the NATA Accreditation. NATA Accreditation only covers the qualitative part of the results reported. This weight disclaimer also covers weight/ weight percentages given.

ACM - Asbestos Containing Material - Products or materials that contain asbestos in an inert bound matrix such as cement or resin. Here taken to be sound material, even as fragments and not fitting through a 7mm X 7 mm sieve.

AF -Includes asbestos free fibres, small fibre bundles and also ACM fragments that pass through a 7mm X 7 mm sieve.

FA -Friable asbestos material such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products.

^ denotes loose fibres of relevant asbestos types detected in soil/dust and fragments of ACM smaller than 7mm diameter.

*** denotes asbestos detected in ACM in bonded form.**

denotes FA.

All samples indicating "No asbestos detected" are assumed to be less than 0.001 % unless the actual approximate weight is given.

The results contained in this report relate only to the sample/s submitted for testing. Australian Safer Environment & Technology accepts no responsibility for whether or not the submitted sample/s is/are representative.

APPENDIX C – HISTORICAL TITLE SEARCHES

Project ID: DLH1188
Stage 1 Contamination Impact Assessment – Addendum

Historical Title Summary for Proposed Alternate Coal Load out Arrangement

LOT/DP	DATE	SITE OWNER	LAND USE/ OCCUPATION
Lot 126/DP 755245	10/12/1981	Donald Wallace Macleod	-
	9/12/1997	Wyong Coal Pty. Limited	-
Lot 128/DP 658436	17/4/1984	John Frederick Co	-
	14/10/1987	Donald Roderick Macleod	-
	13/5/1998	Wyong Coal Pty. Limited	-
Lot 103/DP 755245	29/2/1984	Kenneth Ray Drake & Peter Morris Foster	-
	24/2/1998	Wyong Coal Pty. Limited	-
Lot 194/DP 1032847		Crown Land	Boral Montoro quarry
Lot 168/DP 705480	23/08/1985	Crown Land – Special Lease to Montoro Resources Limited	Boral Montoro factory and offices
	14/03/1991	Crown Land – Special Lease to Montoro Clay Products Pty. Limited	Boral Montoro factory and offices

~ Search ~

re 288 Toobey Road Bushells Ridge
Being Lot 168 in DP 705480.

The above parcel is
Crown Land held in the
name of
The State of New South Wales.

The land is subject to a
Special Lease 1984/7 Gosford
to Montoro Resources Limited
(vide Gazette 23/8/1985 Folio 4511)

Special Lease was transferred
to Montoro Clay Products Pty Limited
(vide Z 541137 Reg 14/3/1991)

Montoro Clay Products Pty Limited
subsequently changed their name
to Boral Montoro Pty. Limited

20/1/16
Jenners Title Searching Co.

Jenners Title Searching Co.

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Information provided through Tri-Search an approved LPINSW Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 168/705480

SEARCH DATE	TIME	EDITION NO	DATE
20/1/2016	10:27 AM	-	-

CERTIFICATE OF TITLE HAS NOT ISSUED

LAND

LOT 168 IN DEPOSITED PLAN 705480
AT DOYALSON
LOCAL GOVERNMENT AREA WYONG
PARISH OF MUNMORAH COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP705480

FIRST SCHEDULE

THE STATE OF NEW SOUTH WALES

SECOND SCHEDULE (2 NOTIFICATIONS)

- * 1 W585527 SPECIAL LEASE 1984/7 GOSFORD TO MONTORO RESOURCES LIMITED. EXPIRES 16.6.2025
- * Z541137 TRANSFER TO MONTORO CLAY PRODUCTS PTY. LIMITED
- * U804941 CHANGE OF NAME LESSEE NOW BORAL MONTORO PTY LIMITED
- * U804942 SUB-LEASE TO SYDNEY ELECTRICITY OF SUBSTATION PREMISES NO. 14019 TOGETHER WITH RIGHTS OF WAY & EASEMENTS FOR ELECTRICITY PURPOSES (SEE DEALING) SHOWN IN PLAN WITH U804942 EXPIRES 15-6-2025
- * 2 W585527 SUBJECT TO THE PROVISIONS OF THE CROWN LANDS CONSOLIDATION ACT, 1913, PARTICULARLY SEC 257, RESTRICTION ON DEALING, COND 1, 5, 8-12, 14, 18-19, 21, 22, 24-26, 28, 31, 44, 59 AND 60 IN T92000 AND COND IN W585527

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

DLA-Bushells Ridg

PRINTED ON 20/1/2016

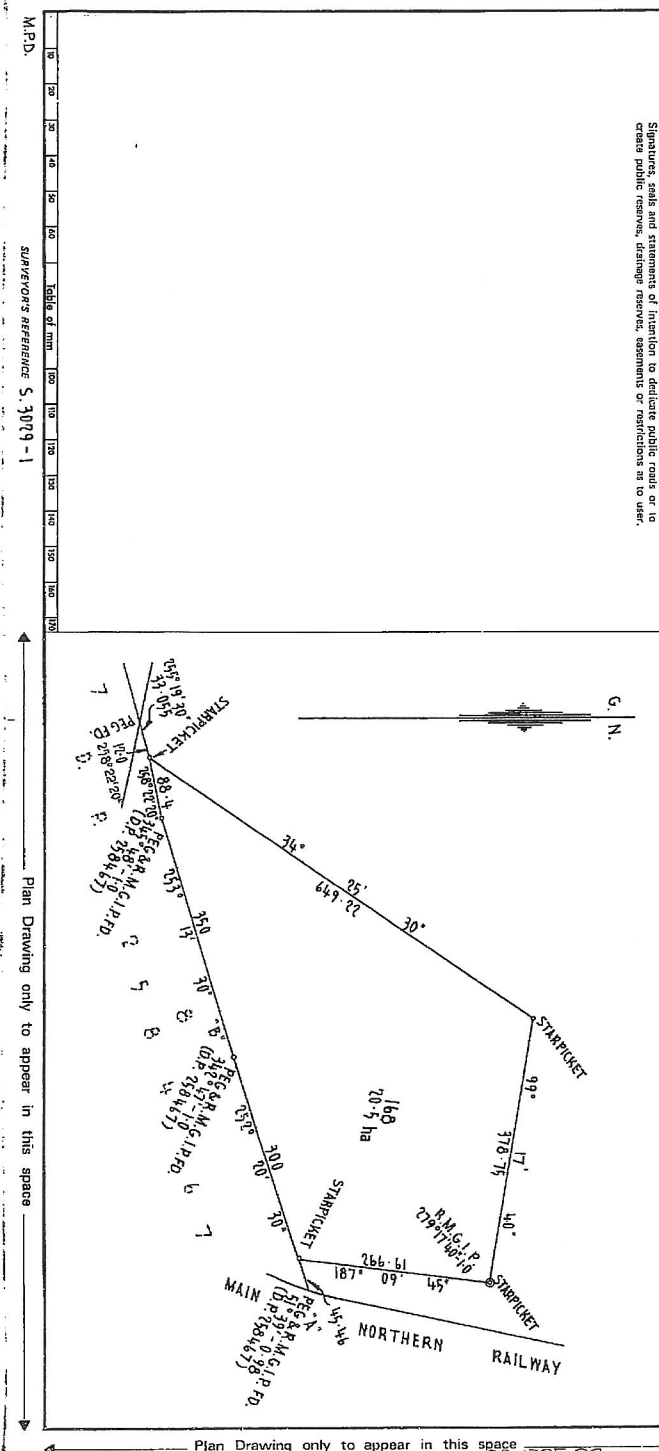
*ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.

PLAN FORM 1

WARNING: CREASING OR FOLDING WILL LEAD TO REFLECTION

OFFICE USE ONLY

Council Clerk's Certificate I hereby certify that - (a) the requirements of the Land Government Act, 1920, and the requirements of the Land Government Act, 1920, as amended, have been complied with in relation to the proposed new road, subdivision, or consolidation of 7 acres or more, and (b) the requirements of section 348 of the Municipalities Act, 1953, and the requirements of the Municipalities Act, 1953, as amended, have been complied with in relation to the proposed new road, subdivision, or consolidation of 7 acres or more. Signature No. Date: (Signature) Council Clerk		Surveyor's Certificate I, DANIEL RONALD MALCOLM , a surveyor registered under the Surveyors Act, 1920, as amended, hereby certify that the survey mentioned in this plan was made by me or by a person acting under my authority, and that the survey was made in accordance with the Survey Act, 1920, and the Survey Regulations, 1921, and was completed on 1st July 1985. Signature: <i>[Signature]</i> Date: 1st July 1985 Signed and sealed by me, the Surveyor, on the day and date above written. Stamp: (Seal of the Surveyor) Field Book No. MD 84 H 94 B Paper No. MD 84 H 94 B PLAN APPROVED 1 JULY 1985 AUTHORISED OFFICER <i>[Signature]</i>		PLAN OF LOT 16B Municipality: WYONG Parish: MUMMERAH County: NORTHUMBERLAND Land District: GORTFORD Reduction Ratio 1: 5000 Lengths are in metres Locality: DOVALSON C.A.: Registered: 1-8-1985 Title System: CROWN LAND Purpose: CROWN TITLE ISSUE Ref. Map: U3620-C*, U4520-41* Last Plan:	
--	--	--	--	--	--



This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day, 2nd August, 1985

Jenners Title Searching Co.

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Information provided through Tri-Search an approved LPINSW Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

18/1/2016 1:45PM

FOLIO: 168/705480

First Title(s): 168/705480

Prior Title(s): CROWN LAND

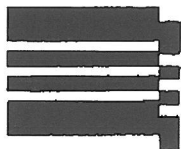
Recorded -----	Number -----	Type of Instrument -----	C.T. Issue -----
1/8/1985	DP705480	DEPOSITED PLAN	FOLIO CREATED CT NOT ISSUED
22/11/1985	W72501	DEPARTMENTAL DEALING	
28/10/1986	W585527	APPLICATION FOR RECORDING OF ACTION AFFECTING CROWN HOLDING	
4/12/1986	W497320	MORTGAGE OF LEASE	
14/3/1991	Z541137	TRANSFER OF LEASE	
25/11/1994	U804941	CHANGE OF NAME	
25/11/1994	U804942	SUB-LEASE	

*** END OF SEARCH ***

DLA-Bushells Ridg

PRINTED ON 18/1/2016

*ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.



W072501

DEPARTMENTAL DEALING



THIS DOCUMENT IS DESIGNED TO RECORD
THE EFFECT OF DEPARTMENTAL ACTIONS
AND AMENDMENTS ON COMPUTER FOLIOS.

DD

	of	
\$ NO FEE		-

21/1

FOLIO IDENTIFIER	FOLIO IDENTIFIER	FOLIO IDENTIFIER	Location
344/705456 168/705480			

REASON FOR PREPARATION: NOTE 22

N.S.W GOVERNMENT GAZETTE ITEM

FIRST SCHEDULE DIRECTIONS

(A) FOLIO IDENTIFIER	(B) DIRECTION	(C) NAME

SECOND SCHEDULE & OTHER DIRECTIONS

(D) FOLIO IDENTIFIER	(E) DIRECTION	(F) NOTFN TYPE	(G) DEALING NUMBER	(H) DETAILS
219	ON	NB	NIL.	SPECIAL LEASE GRANTED VIDE GAZ. 23.8.1985 FOLIO 4511

PREPARED BY <i>[Signature]</i>	TABLE NO CC42	LODGED BY Land Titles Office	REGISTERED - 19	Delivery Directions
DIRECTED BY			22 NOV 1985	CT NO.C.T.
AUTHORISED BY <i>[Signature]</i>	EC 52	Delivery Box Number 10 V	Registrar General	

P.S.P. URGENT

~ Search ~

re Lots 193, 194 & 195 in DP 1032847

The above parcels are Crown Land,
being Reserves within the meaning
of Part 5 of The Crown Lands
Act 1989



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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 193/1032847

SEARCH DATE	TIME	EDITION NO	DATE
29/5/2012	10:37 AM	-	-

CERTIFICATE OF TITLE HAS NOT ISSUED

LAND

LOT 193 IN DEPOSITED PLAN 1032847
AT WYEE
LOCAL GOVERNMENT AREA WYONG
PARISH OF MUNMORAH COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP1032847

FIRST SCHEDULE

THE STATE OF NEW SOUTH WALES

SECOND SCHEDULE (2 NOTIFICATIONS)

- * 1 LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT 1989)
- * 2 THE LAND IS A RESERVE WITHIN THE MEANING OF PART 5 OF THE CROWN LANDS ACT 1989 AND THERE ARE RESTRICTIONS ON TRANSFER AND OTHER DEALINGS IN THE LAND UNDER THAT ACT, WHICH MAY REQUIRE CONSENT OF THE MINISTER.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

JBS-Wyong

PRINTED ON 29/5/2012

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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 194/1032847

SEARCH DATE	TIME	EDITION NO	DATE
29/5/2012	10:36 AM	-	-

CERTIFICATE OF TITLE HAS NOT ISSUED

LAND

LOT 194 IN DEPOSITED PLAN 1032847
AT WYEE
LOCAL GOVERNMENT AREA WYONG
PARISH OF MUNMORAH COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP1032847

FIRST SCHEDULE

THE STATE OF NEW SOUTH WALES

SECOND SCHEDULE (2 NOTIFICATIONS)

- * 1 LAND EXCLUDES MINERALS (S.171 CROWN LANDS ACT 1989)
- * 2 THE LAND IS A RESERVE WITHIN THE MEANING OF PART 5 OF THE CROWN LANDS ACT 1989 AND THERE ARE RESTRICTIONS ON TRANSFER AND OTHER DEALINGS IN THE LAND UNDER THAT ACT, WHICH MAY REQUIRE CONSENT OF THE MINISTER.

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

JBS-Wyong

PRINTED ON 29/5/2012

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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 195/1032847

SEARCH DATE	TIME	EDITION NO	DATE
29/5/2012	10:36 AM	1	20/2/2002

LAND

LOT 195 IN DEPOSITED PLAN 1032847
AT WYEE
LOCAL GOVERNMENT AREA WYONG
PARISH OF MUNMORAH COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP1032847

FIRST SCHEDULE

DARKINJUNG LOCAL ABORIGINAL LAND COUNCIL (AP 8370326)

SECOND SCHEDULE (2 NOTIFICATIONS)

- 1 SUBJECT TO CONDITIONS IN MEMORANDUM AF395175. RESTRICTIONS ON DEALINGS AND PLANS - SEE PART 2, DIVISION 4 AND SECTION 42 ABORIGINAL LAND RIGHTS ACT 1983. APPROVED DETERMINATION OF NATIVE TITLE IS REQUIRED. ANY DEALING OR PLAN MUST ALSO BE ACCOMPANIED BY A REGISTRATION APPROVAL CERTIFICATE OR A STATEMENT OF NON REQUIREMENT.
- 2 8370326 EASEMENT FOR TRANSMISSION LINE 60 METRE(S) WIDE VIDE GOVERNMENT GAZETTE 10/9/1976 FOLIO 3877 AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM

NOTATIONS

NOTE: THE CERTIFICATE OF TITLE FOR THIS FOLIO OF THE REGISTER DOES NOT INCLUDE SECURITY FEATURES INCLUDED ON COMPUTERISED CERTIFICATES OF TITLE ISSUED FROM 4TH JANUARY, 2004. IT IS RECOMMENDED THAT STRINGENT PROCESSES ARE ADOPTED IN VERIFYING THE IDENTITY OF THE PERSON(S) CLAIMING A RIGHT TO DEAL WITH THE LAND COMPRISED IN THIS FOLIO.

REFER ALL DEALINGS AND PLANS TO SD31 AND THE LEGAL DIVISION
UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

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PRINTED ON 29/5/2012

*ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.

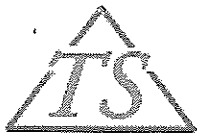
~ Search ~

re Lots 102 & 103 in DP 755245

Schedule of Registered Proprietors

V. 15197 F.209 Kenneth Ray Drake
issued Peter Morris Foster
29/2/1984

J/L 3809433 Wyang Coal Pty. Limited
Reg 24/2/98
A/C 15197-209



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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: AUTO CONSOL 15197-209

SEARCH DATE	TIME	EDITION NO	DATE
29/5/2012	10:35 AM	3	23/11/2011

LAND

LAND DESCRIBED IN SCHEDULE OF PARCELS
LOCAL GOVERNMENT AREA WYONG
PARISH OF MUNMORAH COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM CROWN PLAN 8049.2111

FIRST SCHEDULE

WYONG COAL PTY LIMITED (T 3809433)

SECOND SCHEDULE (4 NOTIFICATIONS)

- 1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE MEMORANDUM S700000B
- 2 EXCEPTING THE LAND BELOW A DEPTH FROM THE SURFACE OF 15.24 METRES BY THE CROWN GRANT
- 3 W283366 EASEMENT FOR TRANSMISSION LINE AFFECTING THE PART OF THE LAND WITHIN DESCRIBED SHOWN 60 METRES WIDE" IN DP636835
2151361 EASEMENT NOW VESTED IN THE NEW SOUTH WALES ELECTRICITY TRANSMISSION AUTHORITY
- 4 AG635105 THIS EDITION ISSUED PURSUANT TO S.111 REAL PROPERTY ACT, 1900

NOTATIONS

UNREGISTERED DEALINGS: NIL

SCHEDULE OF PARCELS

LOTS 102-103 IN DP755245.

*** END OF SEARCH ***

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PRINTED ON 29/5/2012

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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

30/5/2012 2:12PM

FOLIO: AUTO CONSOL 15197-209

Recorded	Number	Type of Instrument	C.T. Issue
19/2/1992		CONSOL HISTORY RECORD CREATED FOR AUTO CONSOL 15197-209	

PARCELS IN CONSOL ARE:
102-103/755245.

23/2/1993	I132027	MISC APPLICATION CROWN LAND	EDITION 1
13/5/1996	2151361	REQUEST	
10/1/1998	3721792	DEPARTMENTAL DEALING	
24/2/1998	3809433	TRANSFER	EDITION 2
23/11/2011	AG635105	APPLN FOR REPLACEMENT CT	EDITION 3

*** END OF SEARCH ***

JBS-Wyong

PRINTED ON 30/5/2012

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CIFICATE OF TITLE



15197209

NEW SOUTH WALES

L PROPERTY ACT, 1900

First Title This Folio

Vol. 15197 Fol. 209

Prior Title Crown Land (FI 104470)

EDITION ISSUED

29 2 1984



I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

CANCELLED

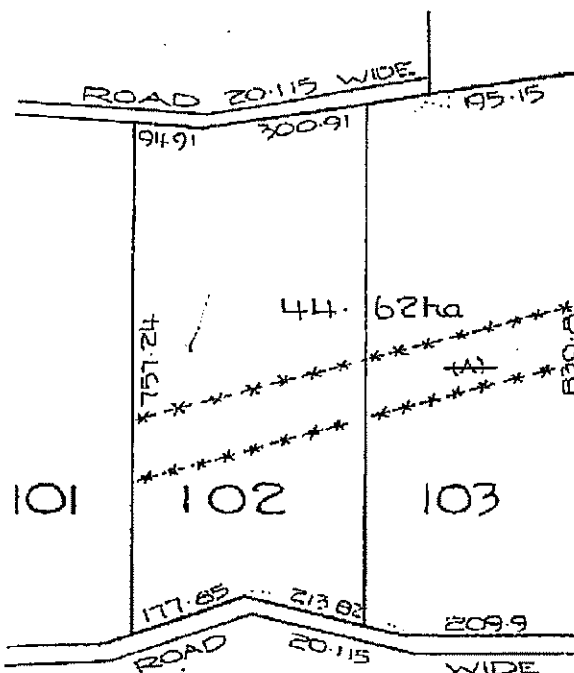
Registrar General.



SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



1982M7

Reg. Gen.

16.4.1984

~~(A) EASEMENT FOR TRANSMISSION LINE 60.75 WIDE GAZ 247 1961 FOL 2311~~

LAND REFERRED TO

Portions 102 and 103 in the Shire of Wyong Parish of Munmorah County of Northumberland.

FIRST SCHEDULE

KENNETH ROY DRAKE in 1/2 share and PETER MORRIS FOSTER in 1/2 share as tenants in common.

SECOND SCHEDULE

1. Excepting land below a depth from the surface of 15.24 metres.
2. Land excludes minerals and is subject to reservations and conditions in favour of the Crown - see Memorandum S700000B.
- AA 3. Conditional Purchase 1969/28 Gosford - subject to the provisions of the Crown Lands Consolidation Act, 1913, particularly as regards -
 - (a) PAYMENT OF BALANCE OF PURCHASE AND OTHER MONEYS;
 - (b) forfeiture provisions;
 - (c) restrictions on dealings, see s.272
 - (d) restrictions on subdivision, see s.257.

GH

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

15197 Fol. 209

(Page 1) Vol.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

FIRST SCHEDULE (continued)
REGISTERED PROPRIETOR

Registrar General

SECOND SCHEDULE (continued)

PARTICULARS

Registrar General

CANCELLATION

W283366^P Resumption - Easement for Transmission Line affecting the part of the land within described shown as "Proposed Easement for Transmission Line 60 metres wide" in DP636835. Registered 16.5.1986.



CANCELLED

SEE AUTO FOLIO

NOTATIONS AND UNREGISTERED DEALINGS

REFER TO
ENCLOSURE

DP 636835

W283366 RA

(Part) R

Easement for Transmission Line shown in DP636835 resumed and noted in the Electricity Commission
Gaz. 73/86 16/10/86

~ Search ~

re Lot 128 in DP 658436

Schedule of Registered Proprietors

V.15216 F.76 John Frederick Co.²

issued

17/4/1984

Lfr X 132391 Donald Rodrick MacLeod

Reg 14/10/87

(V15216 F.76)

Lfr 3983903 Wyong Coal Pty. Limited

Reg 13/5/98

(128/658436)

29/5/12
Jenners Title Searching Co.



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Information provided through Tri-Search an approved LPINSW Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 128/658436

SEARCH DATE -----	TIME -----	EDITION NO -----	DATE -----
29/5/2012	10:34 AM	3	23/11/2011

LAND

LOT 128 IN DEPOSITED PLAN 658436
LOCAL GOVERNMENT AREA WYONG
PARISH OF MUNMORAH COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP658436

FIRST SCHEDULE

WYONG COAL PTY LIMITED (T 3983903)

SECOND SCHEDULE (3 NOTIFICATIONS)

- 1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE MEMORANDUM S700000B
- 2 EXCEPTING THE LAND BELOW A DEPTH FROM THE SURFACE OF 15.24 METRES BY THE CROWN GRANT
- 3 AG635105 THIS EDITION ISSUED PURSUANT TO S.111 REAL PROPERTY ACT, 1900

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

JBS-wyong

PRINTED ON 29/5/2012

*ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.



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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

29/5/2012 3:17PM

FOLIO: 128/658436

First Title(s): VOL 15216 FOL 76
Prior Title(s): VOL 15216 FOL 76

Recorded	Number	Type of Instrument	C.T. Issue
5/6/1995		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
10/1/1998	3721792	DEPARTMENTAL DEALING	
9/3/1998	3838946	MISC APPLICATION CROWN LAND	EDITION 1
13/5/1998	3983903	TRANSFER	EDITION 2
23/11/2011	AG635105	APPLN FOR REPLACEMENT CT	EDITION 3

*** END OF SEARCH ***

JBS-wyong

PRINTED ON 29/5/2012

*ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.

CERTIFICATE OF TITLE



15216076

NEW SOUTH WALES

REAL PROPERTY ACT, 1900

Vol. 15216 Fol. 76

EDITION ISSUED

17 4 1984

First Title This Folio

Prior Title Crown Land (FI 104472)



I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

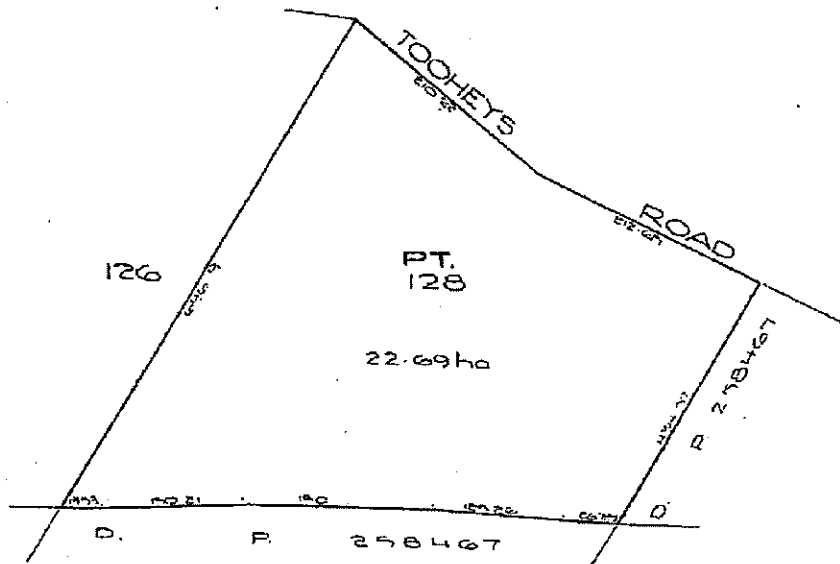

 Registrar General.


PLAN SHOWING LOCATION OF LAND

CANCELLED

LENGTHS ARE IN METRES

SEE AUTO FOLIO




THE LAND WITHIN
DESCRIBED IS
LOT 128 IN DP658436

LAND REFERRED TO

The part of Portion 128 shown in the plan hereon in the Shire of Wyong Parish of Munmorah County of Northumberland.

FIRST SCHEDULE

JOHN FREDERICK CO. 

SECOND SCHEDULE

1. Excepting land below a depth from the surface of 15.24 metres.
2. Land excludes minerals and is subject to reservations and conditions in favour of the Crown - see Memorandum S700000B.
3. Conditional Purchase 1971/11 Gosford - subject to the provisions of the Crown Lands Consolidation Act, 1913, particularly as regards -
 - (a) PAYMENT OF BALANCE OF PURCHASE AND OTHER MONEYS;
 - (b) forfeiture provisions;
 - (c) restrictions on dealings, see s.272
 - (d) restrictions on subdivision, see s.257.

 PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON
 (Page 1) Vol. 15216 Fol. 76

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR

Registrar General

Donald Roderick Macleod by Transfer X132391 Registered 14-10-1987



CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

PARTICULARS

Registrar General CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

X132391 TR.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

CERTIFICATE OF TITLE



15216076

NEW SOUTH WALES

REAL PROPERTY ACT, 1900

Vol. 15216 Fol. 76

EDITION ISSUED

17 4 1984

First Title This Folio

Prior Title Crown Land (FI 104472)



I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

[Signature]
Registrar General.

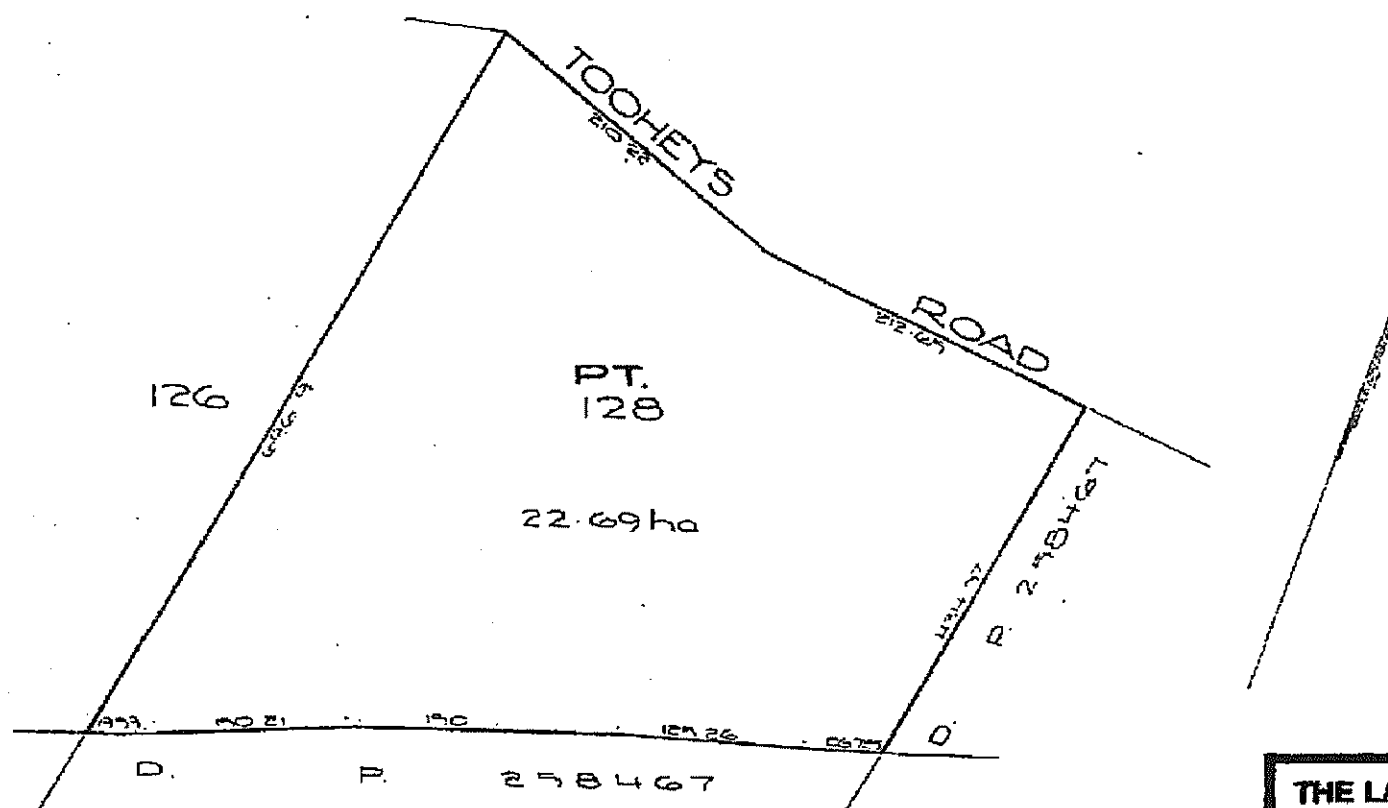


PLAN SHOWING LOCATION OF LAND

CANCELLED

LENGTHS ARE IN METRES

SEE AUTO FOLIO



THE LAND WITHIN
DESCRIBED IS
LOT 128 IN DP658436

LAND REFERRED TO

The part of Portion 128 shown in the plan hereon in the Shire of Wyong Parish of Munmorah County of Northumberland.

FIRST SCHEDULE

JOHN FREDERICK CO

SECOND SCHEDULE

1. Excepting land below a depth from the surface of 15.24 metres.
2. Land excludes minerals and is subject to reservations and conditions in favour of the Crown - see Memorandum S700000B.
3. Conditional Purchase 1971/11 Gosford - subject to the provisions of the Crown Lands Consolidation Act, 1913, particularly as regards -
 - (a) PAYMENT OF BALANCE OF PURCHASE AND OTHER MONEYS;
 - (b) forfeiture provisions;
 - (c) restrictions on dealings, see s.272
 - (d) restrictions on subdivision, see s.257.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON (Page 1) Vol. 15216 Fol. 76

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

FIRST SCHEDULE (continued)
REGISTERED PROPRIETOR

Registrar General

Donald Roderick Macleod by Transfer X132391 Registered 14-10-1987



CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

PARTICULARS

Registrar General

CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

X132391 7K.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

~ Search ~

re Lot 126 in DP 755245

Schedule of Registered Proprietors

V. 14590 F. 96 Donald Wallace MacLeod

issued

10/12/81

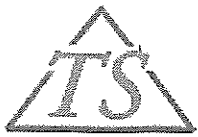
Lfr 365 1181 Wyong Coal Pty. Limited

Reg 9/12/97

(126/755245)

WJ 29/5/12

Jenners Title Searching Co.



Jenners Title Searching Co.

LPI On-Line

Jenners Title Searching Co. hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act.

Information provided through Tri-Search an approved LPI/NSW Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 126/755245

SEARCH DATE	TIME	EDITION NO	DATE
29/5/2012	10:35 AM	2	23/11/2011

LAND

LOT 126 IN DEPOSITED PLAN 755245
LOCAL GOVERNMENT AREA WYONG
PARISH OF MUNMORAH COUNTY OF NORTHUMBERLAND
(FORMERLY KNOWN AS PORTION 126)
TITLE DIAGRAM CROWN PLAN 8264.2111

FIRST SCHEDULE

WYONG COAL PTY LIMITED (T 3651181)

SECOND SCHEDULE (3 NOTIFICATIONS)

- 1 LAND EXCLUDES MINERALS AND IS SUBJECT TO RESERVATIONS AND CONDITIONS IN FAVOUR OF THE CROWN - SEE MEMORANDUM S700000B
- 2 EXCEPTING LAND BELOW A DEPTH FROM THE SURFACE OF 15.24 METRES
- 3 AG635105 THIS EDITION ISSUED PURSUANT TO S.111 REAL PROPERTY ACT, 1900

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

JBS-Wyong

PRINTED ON 29/5/2012

*ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.



Jenners Title Searching Co.

LPI On-Line

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Information provided through Tri-Search an approved LPI/NSW Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

29/5/2012 3:41PM

FOLIO: 126/755245

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 14590 FOL 96

Recorded	Number	Type of Instrument	C.T. Issue
14/12/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
2/2/1989		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
16/4/1991		AMENDMENT: TITLE DIAGRAM	
9/12/1997	3651181	TRANSFER	EDITION 1
10/3/1999	5667475	DEPARTMENTAL DEALING	
23/11/2011	AG635105	APPLN FOR REPLACEMENT CT	EDITION 2

*** END OF SEARCH ***

JBS-Wyong

PRINTED ON 29/5/2012

*ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.

NEW SOUTH WALES

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1900



14590

No. 55389

Vol. 14590 Fol. 96

EDITION ISSUED

10 12 1981



I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

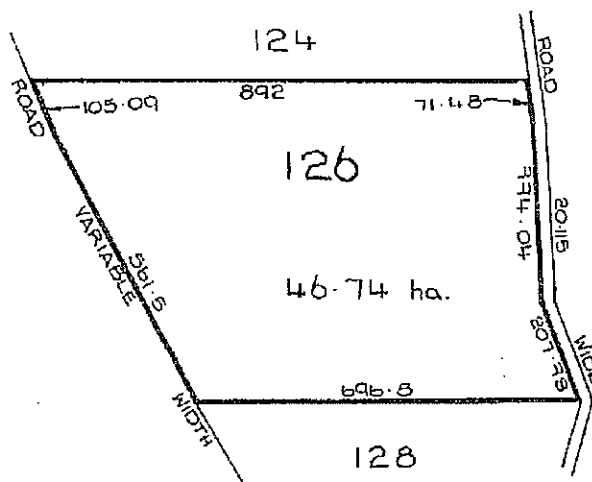
~~CANCELLED~~

Registrar General.



PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



LAND REFERRED TO

Portion 126 in the Shire of Wyong Parish of Munmorah and County of Northumberland.

FIRST SCHEDULE

DONALD WALLACE MACLEOD.

SECOND SCHEDULE

G S B

1. Excepting land below a depth from the surface of 15.24 metres.
2. Land excludes minerals and is subject to reservations and conditions in favour of the Crown - See Memorandum S7000003.
3. Restrictions on dealings - see section 272 Crown Lands Consolidation Act, 1913 (C.P. 1963/17 Gosford).

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

14590 Fol. 96 (Page 1) Vol.

NOTE: ENTRIES MADE THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

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NOTATIONS AND UNREGISTERED DEALINGS

--	--	--

SECOND SCHEDULE (continued)
PARTICULARS
Registrar General CANCELLATION

--	--	--

FIRST SCHEDULE (continued)
REGISTERED PROPRIETOR
Registrar General

CERTIFICATE OF TITLE



15216076

NEW SOUTH WALES

REAL PROPERTY ACT, 1900

Vol. 15216 Fol. 76

EDITION ISSUED

17 4 1984

First Title This Folio

Prior Title Crown Land (FI 104472)



I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

[Signature]
Registrar General.

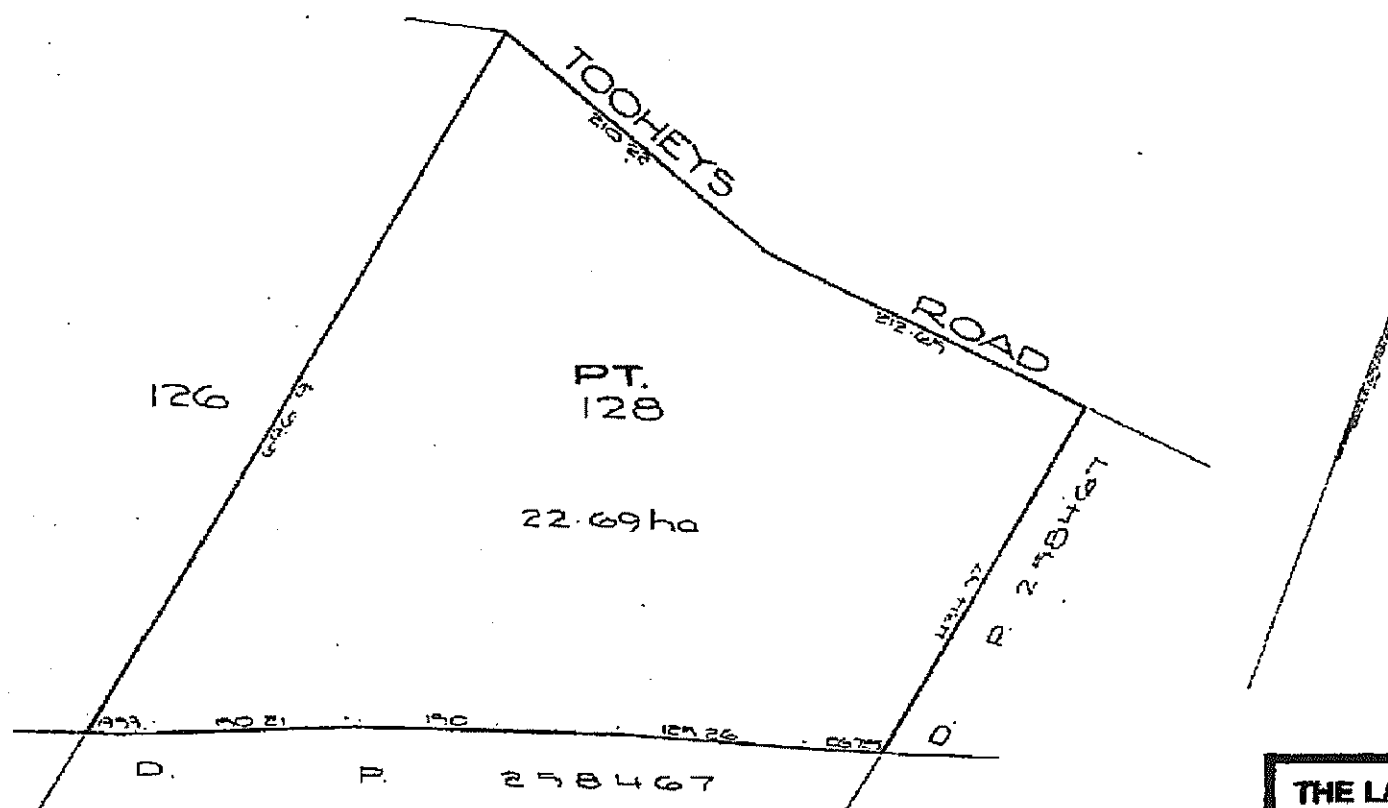


PLAN SHOWING LOCATION OF LAND

CANCELLED

LENGTHS ARE IN METRES

SEE AUTO FOLIO



THE LAND WITHIN
DESCRIBED IS
LOT 128 IN DP658436

LAND REFERRED TO

The part of Portion 128 shown in the plan hereon in the Shire of Wyong Parish of Munmorah County of Northumberland.

FIRST SCHEDULE

JOHN FREDERICK CO

SECOND SCHEDULE

1. Excepting land below a depth from the surface of 15.24 metres.
2. Land excludes minerals and is subject to reservations and conditions in favour of the Crown - see Memorandum S700000B.
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 - (b) forfeiture provisions;
 - (c) restrictions on dealings, see s.272
 - (d) restrictions on subdivision, see s.257.

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NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR

Registrar General

Donald Roderick Macleod by Transfer X132391 Registered 14-10-1987

**CANCELLED****SEE AUTO FOLIO**

SECOND SCHEDULE (continued)

PARTICULARS

Registrar General

CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

X132391 7K.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

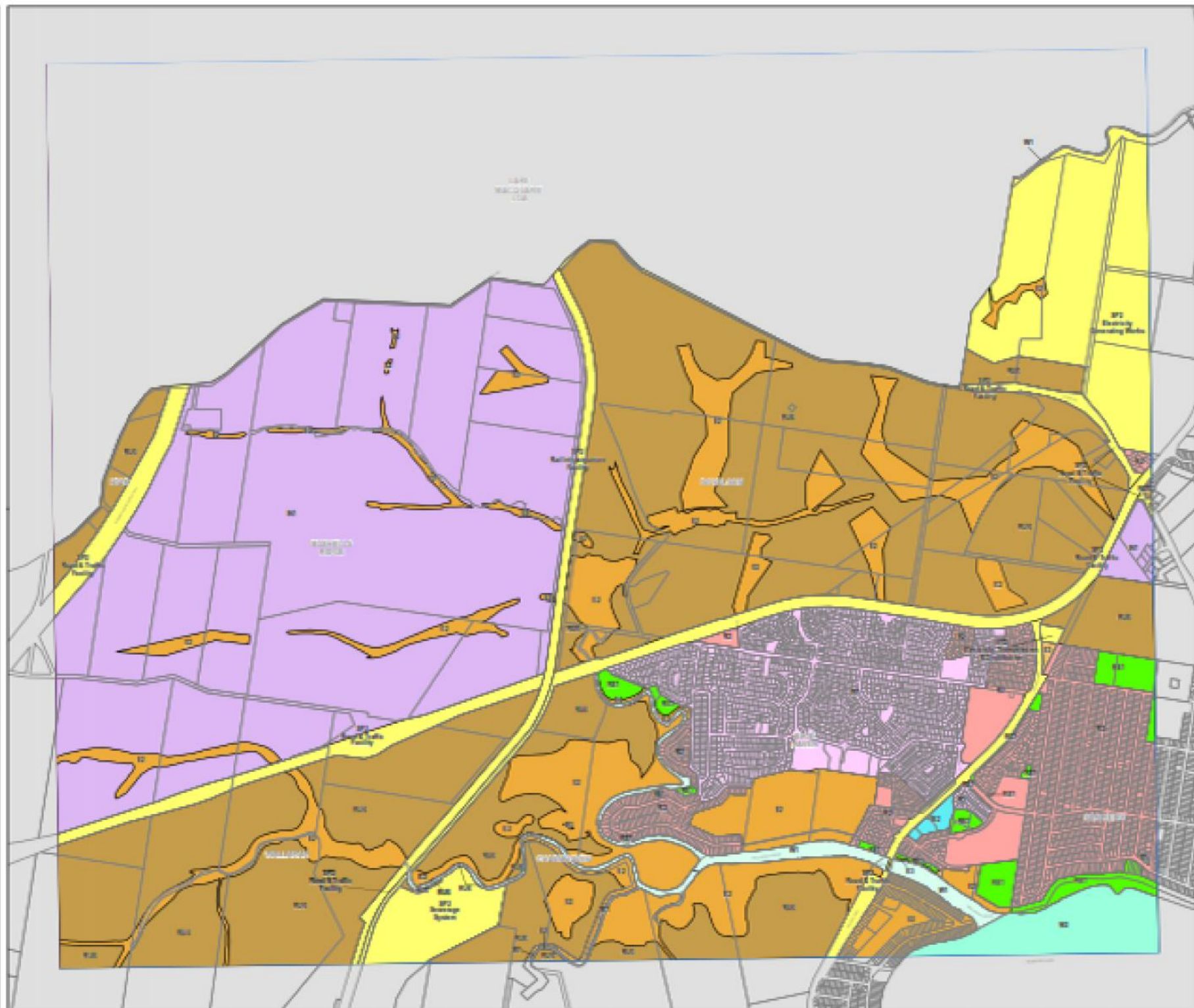
APPENDIX D – WYONG LEP ZONING MAP

Zone

- | | |
|------------|------------------------------------|
| P1 | Neighbourhood Centre |
| P2 | Local Centre |
| P3 | Commercial Core |
| P4 | Mixed Use |
| P5 | Business Development |
| P6 | Enterprise Corridor |
| P7 | Business Park |
| E1 | National Parks and Nature Reserves |
| E2 | Environmental Conservation |
| E3 | Environmental Management |
| E4 | Environmental Living |
| I1 | General Industrial |
| I2 | Light Industrial |
| R1 | General Residential |
| R2 | Low Density Residential |
| R3 | Medium Density Residential |
| R4 | Large Lot Residential |
| RE1 | Public Recreation |
| RE2 | Private Recreation |
| PR1 | Primary Production |
| PL1 | Rural Landscape |
| PL2 | Forestry |
| VL1 | Village |
| T1 | Transition |
| SP1 | Special Activities |
| SP2 | Infrastructure |
| SP3 | Tourist |
| W1 | Natural Waterways |
| W2 | Recreational Waterways |
| DM | Deferred Matter |

Credibility

- ☐
- Cadastre 25/11/13 © Land and Property Information (LPI)



APPENDIX E – AERIAL PHOTOGRAPHY

1954



1966

N.S.W.
1439
5160

GOSFORD-
LAKE
MACQUARIE

Run 5

15,500' ASL

114.44 mm

CROWN
COPY N.S.
LANDS PHOTO
LOG-E

1975

UAG 1025 151.45

0355



GOSFORD

RUN 4
28.5.75

6706M
151.45 MM
←

1ST COPY

CROW
COPY
LANDS

N.S.W. 2315



1984

UAG 1025 151.45

W 384 5

GOSFORD
1:40000
NSW 3384

RUN 4
27.4.84

6431 M ASL
151.45MM
→



1991



UAG 1025 151/25

19 5 8 6

COPYRIGHT
LAND
NSW

RUN 6
21-9-91

4145 M ASL
151.45MM



RD
00 COLOUR
39

1994



Box Scale
(colour)

Run 6
15-09-94
102-214

4115 M ASL
152.7 mm
↑

© Surveyor General's Department
Victoria, Australia

2001



ORD
00 Approx. Scale
1586 (M2288)

RUN 6
29-10-01
39-61

152.76 mm



2006



0109

Scale

1)

RUN 6

11-04-06

184-206

152.76 mm



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APPENDIX F – GROUNDWATER BORE SEARCH INFORMATION

Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)

Document Generated on Tuesday, May 29, 2012

[Print Report](#)

[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

Work Requested -- GW201704

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW201704
LIC-NUM	20BL172760
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Mines
COMMENCE-DATE	
COMPLETION-DATE	2011-07-04
FINAL-DEPTH (metres)	7.20
DRILLED-DEPTH (metres)	7.20
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	N/A
GWMA	017 - HUNTER
GW-ZONE	-
STANDING-WATER-LEVEL	1.90
SALINITY	
YIELD	

Site Details [\(top\)](#)

REGION	20 - HUNTER
RIVER-BASIN	211 - MACQUARIE - TUGGERAH LAKES
AREA-DISTRICT	
CMA-MAP	9131-1S
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6325840.00
EASTING	354686.00
LATITUDE	33 11' 48"
LONGITUDE	151 26' 28"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE GPS - Global Positioning System
 REMARK

Form-A [\(top\)](#)

COUNTY NORTHUMBERLAND
 PARISH MUNMORAH
 PORTION-LOT-DP 49//755245

Licensed [\(top\)](#)

COUNTY NORTHUMBERLAND
 PARISH MUNMORAH
 PORTION-LOT-DP 49 755245

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	7.20	125			Auger - Sol Flight
1	1	Casing	PVC Class 18	-0.75	4.20	60			Screwed; Seated on Bottom; Ca
1	1	Opening	Slots - Horizontal	4.20	7.20	60			PVC Class 18; Mechanica Slotted; A: .5mm; Screwed
1		Annulus	Bentonite	0.00	2.80	125	60		
1		Annulus	Waterworn/Rounded	2.80	7.20	125	60		Graded; G: 1-2mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D- D- L	YIELD	TEST-HOLE- DEPTH (metres)	DURATION	SALINITY
4.50	6.70	2.20		1.90					

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.50	0.50	Topsoil		
0.50	4.50	4.00	Silty Clay, light brown		
4.50	6.70	2.20	Sandy Clay, grey		

6.70 7.20 0.50 Sandstone, weathered, yellow

Warning To Clients: This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DIPNR) by drillers, licensees and other sources. The DIPNR does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)

Document Generated on Tuesday, May 29, 2012

[Print Report](#)

[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

Work Requested -- GW200380

Works Details [\(top\)](#)

GROUNDWATER NUMBER GW200380
LIC-NUM 20BL169930
AUTHORISED-PURPOSES MONITORING BORE
INTENDED-PURPOSES MONITORING BORE
WORK-TYPE Bore
WORK-STATUS
CONSTRUCTION-METHOD Rotary Air
OWNER-TYPE
COMMENCE-DATE
COMPLETION-DATE 2005-11-07
FINAL-DEPTH (metres) 6.00
DRILLED-DEPTH (metres) 6.00
CONTRACTOR-NAME
DRILLER-NAME
PROPERTY N/A
GWMA -
GW-ZONE -
STANDING-WATER-LEVEL 5.00
SALINITY
YIELD

Site Details [\(top\)](#)

REGION 20 - HUNTER
RIVER-BASIN
AREA-DISTRICT
CMA-MAP
GRID-ZONE
SCALE
ELEVATION
ELEVATION-SOURCE
NORTHING 6324782.00
EASTING 357960.00
LATITUDE 33 12' 24"
LONGITUDE 151 28' 34"
GS-MAP

AMG-ZONE 56
 COORD-SOURCE Map Interpretation
 REMARK

Form-A [\(top\)](#)

COUNTY NORTHUMBERLAND
 PARISH MUNMORAH
 PORTION-LOT-DP 168/705480

Licensed [\(top\)](#)

COUNTY NORTHUMBERLAND
 PARISH MUNMORAH
 PORTION-LOT-DP 168 705480

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	6.00	152			Rotary Air
1	1	Casing	PVC Class 18	-1.00	3.00	60			C: -.1-0m; Screwed; Other; Cap
1	1	Opening	Screen - Gauze/Mesh	3.00	6.00	60			(Unknown); PVC Class 18; A: .5mm; Screwed

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	6.00	6.00		clay	

Warning To Clients: This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DIPNR) by drillers, licensees and other sources. The DIPNR does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)

Document Generated on Tuesday, May 29, 2012

[Print Report](#)

[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

Work Requested -- GW078390

Works Details [\(top\)](#)

GROUNDWATER NUMBER GW078390
LIC-NUM 20BL166440
AUTHORISED-PURPOSES DOMESTIC
INTENDED-PURPOSES DOMESTIC
WORK-TYPE Bore
WORK-STATUS (Unknown)
CONSTRUCTION-METHOD
OWNER-TYPE
COMMENCE-DATE
COMPLETION-DATE
FINAL-DEPTH (metres) 3.00
DRILLED-DEPTH (metres)
CONTRACTOR-NAME
DRILLER-NAME
PROPERTY N / A
GWMA -
GW-ZONE -
STANDING-WATER-LEVEL
SALINITY
YIELD

Site Details [\(top\)](#)

REGION 20 - HUNTER
RIVER-BASIN
AREA-DISTRICT
CMA-MAP
GRID-ZONE
SCALE
ELEVATION
ELEVATION-SOURCE
NORTHING 6323730.00
EASTING 359361.00
LATITUDE 33 12' 58"
LONGITUDE 151 29' 27"
GS-MAP

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY NORTHUMBERLAND
PARISH MUNMORAH
PORTION-LOT-DP (PART PORTION 60)

Licensed [\(top\)](#)

COUNTY NORTHUMBERLAND
PARISH MUNMORAH
PORTION-LOT-DP 142 218002

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

no details

Warning To Clients: This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DIPNR) by drillers, licensees and other sources. The DIPNR does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)

Document Generated on Tuesday, May 29, 2012

[Print Report](#)

[Works Details](#) [Site Details](#) [Form A](#) [Licensed](#) [Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

Work Requested -- GW200938

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW200938
LIC-NUM	20BL167846
AUTHORISED-PURPOSES	DOMESTIC STOCK
INTENDED-PURPOSES	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Down Hole Hammer
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2000-08-08
FINAL-DEPTH (metres)	36.00
DRILLED-DEPTH (metres)	36.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	N/A
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	14.00
SALINITY	
YIELD	0.50

Site Details [\(top\)](#)

REGION	20 - HUNTER
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6322112.00
EASTING	351483.00
LATITUDE	33 13' 47"
LONGITUDE	151 24' 22"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY NORTHUMBERLAND
 PARISH WYONG
 PORTION-LOT-DP 4//864374

Licensed [\(top\)](#)

COUNTY NORTHUMBERLAND
 PARISH WYONG
 PORTION-LOT-DP 4 864374

Construction [\(top\)](#)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	36.00	210			Down Hole Hammer
1	1	Casing	PVC Class 9	-0.30	36.00	160	146.6		Screwed and Glued; Seated on Bottom; Cap
1	1	Casing	Concrete	-0.20	2.00	210			
1	1	Opening	Slots - Vertical	12.00	36.00	160			PVC Class 9; Sawn; SL: .15mm; A: 2mm

Water Bearing Zones [\(top\)](#)

FROM- DEPTH (metres)	TO- DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S-W- L	D-D- L	YIELD	TEST- HOLE- DEPTH (metres)	DURATION	SALINITY
17.80	18.10	0.30		14.00	20.00	0.10		0.50	Fresh
30.90	31.30	0.40		14.00	36.00	0.50		3.00	Fresh

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.80	1.80	CLAY BROWN		
1.80	2.90	1.10	SANDY CLAY YELLOW		
2.90	17.80	14.90	CLAY BROWN		

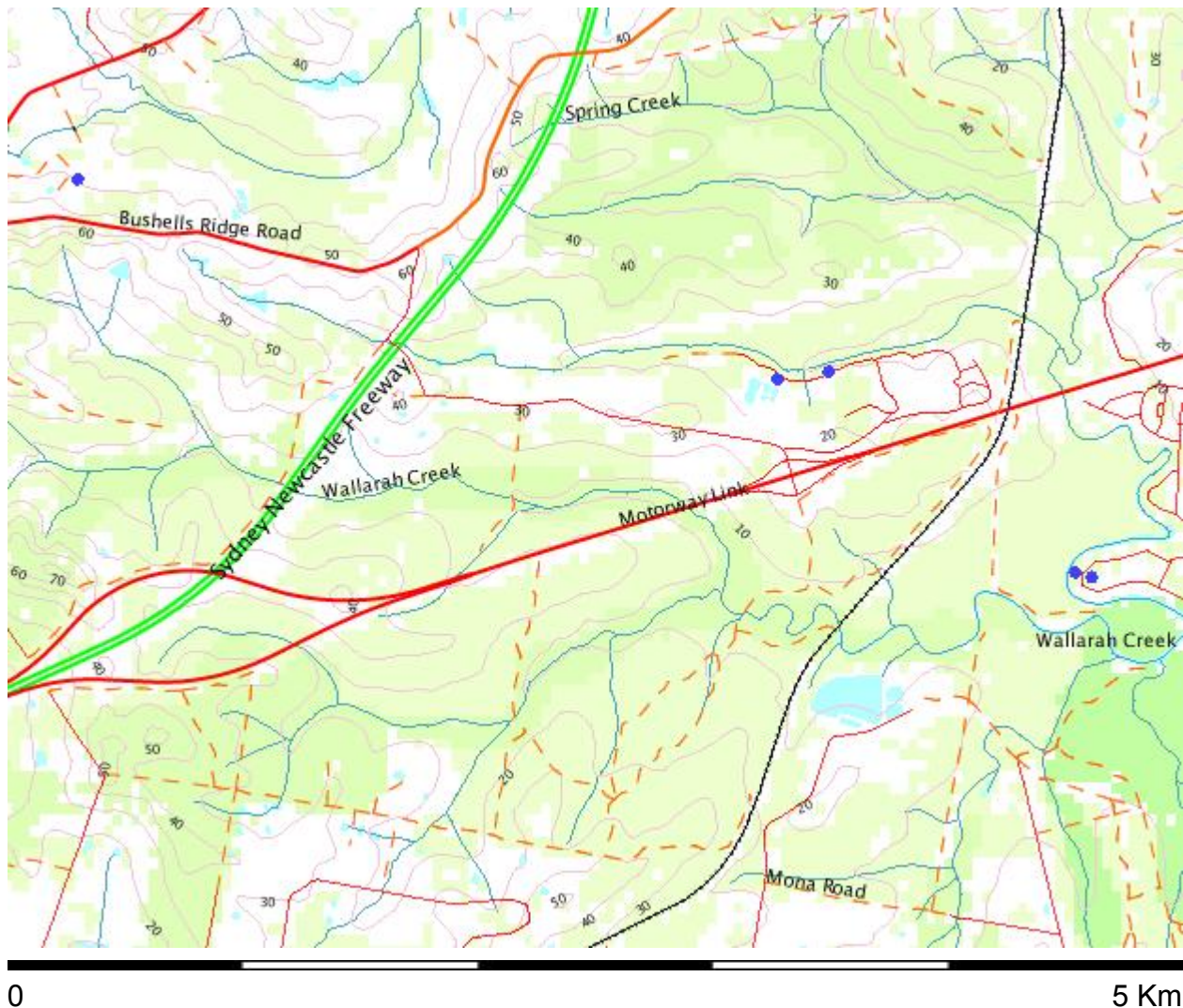
17.80	18.10	0.30	CONGLOMERATE W.B
18.10	24.20	6.10	CLAY GREY
24.20	30.90	6.70	CONGLOMERATE GREY
30.90	31.30	0.40	CONGLOMERATE W.B
31.30	35.50	4.20	CONGLOMERATE
35.50	36.00	0.50	CLAY BROWN

Warning To Clients: This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DIPNR) by drillers, licensees and other sources. The DIPNR does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

Map from the NSW Natural Resource Atlas

Map created with NSW Natural Resource Atlas - <http://www.nratlas.nsw.gov.au>

Tuesday, May 29, 2012



Legend

Symbol	Layer	Custodian
	Groundwater Bores	
	Cities and large towns	renderImage: Cannot build image from features
	Populated places	renderImage: Cannot build image from features
	Towns	
	Primary/arterial road	
	Motorway/freeway	
	Railway	
	Runway	
	Contour	
	Background	
	Topographic base map	

Copyright © 2012 New South Wales Government. Map has been compiled from various sources and may contain errors or omissions. No representation is made as to its accuracy or suitability.

APPENDIX G – DANGEROUS GOODS SEARCH



SafeWork NSW

SafeWork NSW
92-100 Donnison Street, Gosford, NSW, 2250
Locked Bag 2906, Lisarow, NSW, 2252 |
Customer Service Centre 13 10 50
licensing@safework.nsw.gov.au | www.safework.nsw.gov.au

Our Ref: D16/519376
Your Ref: Jon Mansfield

11 February 2016

Attention: Jon Mansfield
DLA Environmental Services
42B Church St
Maitland NSW 2320

Dear Mr Mansfield,

RE SITE: 288 Tooheys Rd Bushells Ridge NSW

I refer to your site search request received by SafeWork NSW on 5 February 2016 requesting information on Storage of Hazardous Chemicals for the above site.

Enclosed are copies of the documents that SafeWork NSW holds on record number 35/033242 relating to the storage of Hazardous Chemicals at the above-mentioned premises.

For further information or if you have any questions, please call our Customer Service Centre on 13 10 50 or email licensing@safework.nsw.gov.au

Yours sincerely,

Brent Jones
Customer Service Officer
Customer Service Centre - Operations
SafeWork NSW

CONTACT FOR NOTIFICATION INQUIRIES

Title: Mr / Miss / Ms / Mrs / Other (please specify) MR Family name BUTTEL
Given name COLIN Other names ROSS
Gender ☒ Male ☐ Female (please circle) Date of birth 1/9/53 Place of birth SYDNEY
Postal address P.O. Box 9234
Suburb WYEE State N.S.W. Postcode 2259
Business phone 43 908718 Business fax number 43 592023
Business email address BUDPLANT@BIGPOND.NET.AU.

Previous Licence Number or Acknowledgement Number (if known)

35/ 033242

Previous Occupier (if known)

Site on which dangerous goods are to be kept

Number Street

TOOHEYS RD EAST WYEE

Nearest cross Street

MOTORWAY LINK

Lot and DP if no street number

Is the site staffed? If yes state number of employees 5Site staffing: Hours per day 7 1/2 Days per week 5

Site Emergency Contact

Phone number

(02) 43 908718

Name

COLIN BUTTEL

Nature of site (eg petrol station, warehouse etc)

DECANTING CYLINDER

Nature of your primary business activity

MANUFACTURING

ABN Number (if any)

81050105881

Website details (if any)

What is the ANSZIC code most applicable to your business? (see guide for list of codes and further information)

Code

232

Description

PALLET BOX & CRATE MANUFACTURING

Attach a site sketch(s) of the premises. Refer to the Guide for information on the requirements for the site sketch.

Attach a photocopy page from a local Street Directory or other map showing the locality of the premises. Mark the location of the premises with an X

\$ 100
Date 24-3-06
Rec. No. 448969

< Notifiable
Anls

J. H. H.

NOTIFICATION OF DANGEROUS GOODS ON PREMISES FORM

FDG01

List the dangerous goods that will be stored and/or processed on these premises. Copy this page and attach additional sheets if there is insufficient space.

Identifier	Type of storage location or process	Class	Maximum Storage Capacity (L, kg, M ³)
1	DECANTING CYLINDER	2.1	210 KG

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Symbol	Typical Qty	Unit eg L, kg, M ³
1075	PETROLEUM GAS LIQUEFIED	2.1		LPG PROPANE	2WE		210 KG

Identifier	Type of storage location or process	Class	Maximum Storage Capacity (L, kg, M ³)

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Symbol	Typical Qty	Unit eg L, kg, M ³

Identifier	Type of storage location or process	Class	Maximum Storage Capacity (L, kg, M ³)

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Symbol	Typical Qty	Unit eg L, kg, M ³

Identifier	Type of storage location or process	Class	Maximum Storage Capacity (L, kg, M ³)

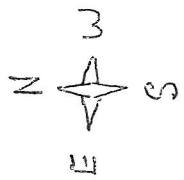
UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Symbol	Typical Qty	Unit eg L, kg, M ³

Identifier	Type of storage location or process	Class	Maximum Storage Capacity (L, kg, M ³)

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Symbol	Typical Qty	Unit eg L, kg, M ³

VACANT LAND
GRASS AREA,

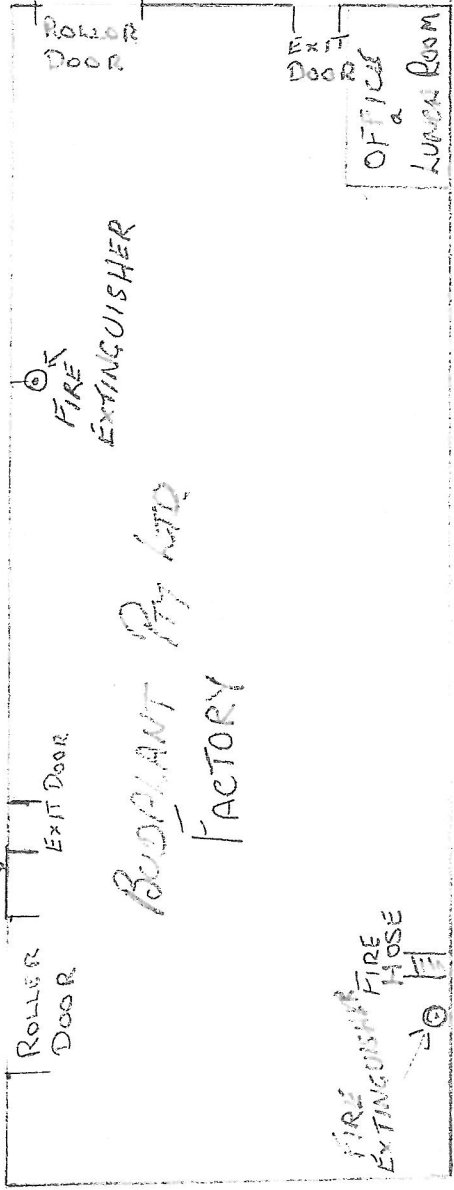
LPG
DECANTING CYLINDER



ROAD IN

ROAD IN

12m



BUDDHANT PLY LTD
FACTORY

ROAD OUT TO MAIN GATE →

ROAD
OFFICE

HO
FIRE
HYDRANT

VACANT LAND
GRASS AREA

HO
FIRE
HYDRANT



APPLICATION FOR RENEWAL OF LICENCE TO KEEP DANGEROUS GOODS

ISSUED UNDER AND SUBJECT TO THE PROVISIONS OF THE DANGEROUS GOODS ACT, 1975 AND REGULATION THEREUNDER

DECLARATION: Please renew licence number 35/033242 to 22/04/2000. I confirm that all the licence details shown below are correct (amend if necessary).

Stephen Head

(Signature)

for: BORAL MONTORO P/L

STEPHEN HEAD

(Please print name)

11/3/99

(Date signed)

THIS SIGNED DECLARATION SHOULD BE RETURNED TO:

WorkCover New South Wales
Dangerous Goods Licensing Section
GPO BOX 5364
SYDNEY 2001

Enquiries: ph (02) 9370 5187
fax (02) 9370 6105

Details of licence on 5 March 1999

Licence Number 35/033242 Expiry Date 23/04/1999

Licensee BORAL MONTORO P/L ACN 002 944 694
BORAL ROOFING

Postal Address: BORAL ROOFING PRIVATE BAG 9001, SOUTH PENRITH BUSINESS
PENRITH SOUTH NSW 2750

Licencee Contact ~~PATRICK MULHOLLAND~~ ^{STEPHEN HEAD} Ph. 0243 909533 Fax. 0243 907689

Premises Licensed to Keep Dangerous Goods
BORAL MONTORO P/L BORAL ROOFING
TOOHEYS RD WYEE 2259

Nature of Site MANUFACTURING N.E.C.

Major Supplier of Dangerous Goods BORAL

Emergency Contact for this Site STEVE HEAD Ph. 0417 674533

Site staffing 24HRS 7DAYS

Details of Depots

Depot No.	Depot Type	Goods Stored in Depot	Qty
1	DECANTING CYLINDER(S)	Class 2.1	210 KG
	UN 1978 PROPANE		210 KG
1A	DECANTING CYLINDER(S)	Class 2.1	210 KG
	UN 1978 PROPANE		210 KG



Application for Licence to Keep Dangerous Goods

WORKCOVER
NEW SOUTH WALES

Application for



new licence



amendment



transfer

WORKCOVER
NEW SOUTH WALES

expired licence

PART A - Applicant and site information

1 Name of applicant

ACN

BUDPLANT PTY. ~~LTD~~ LIMITED 050-105-881

2 Postal address of applicant

Suburb/Town

Postcode

39 COORIGAL ST LAKEHAVEN 2263

3 Trading name or site occupier's name

BUDPLANT PTY LTD

4 Contact for licence inquiries

Phone

Fax

Name

43 908718 43 921438 COLIN BUTLER

5 Previous licence number (if known)

35/

033242

6 Previous occupier (if known)

7 Site to be licensed

No

Street

TOOHAYS RD c/- BORAL ROOFING SITE

Suburb / Town

Postcode

~~FAST~~ WYKE

8 Main business of site

PALLETS BOX & CRATE MANUFACTURERS.

9 Site staffing: Hours per day

8

Days per week

5

10 Emergency contact

Phone

Name

43 908718 COLIN BUTLER

11 Major supplier of dangerous goods

ORIGIN ENERGY

12 If a new site or for amendments to depots

Plan stamped by:

Name of Accredited Consultant

Date stamped

BALLO STRICKLAND

15-2-00

I certify that the details in this application (including any accompanying computer disk) are correct and cover all licensable quantities of dangerous goods kept on the premises.

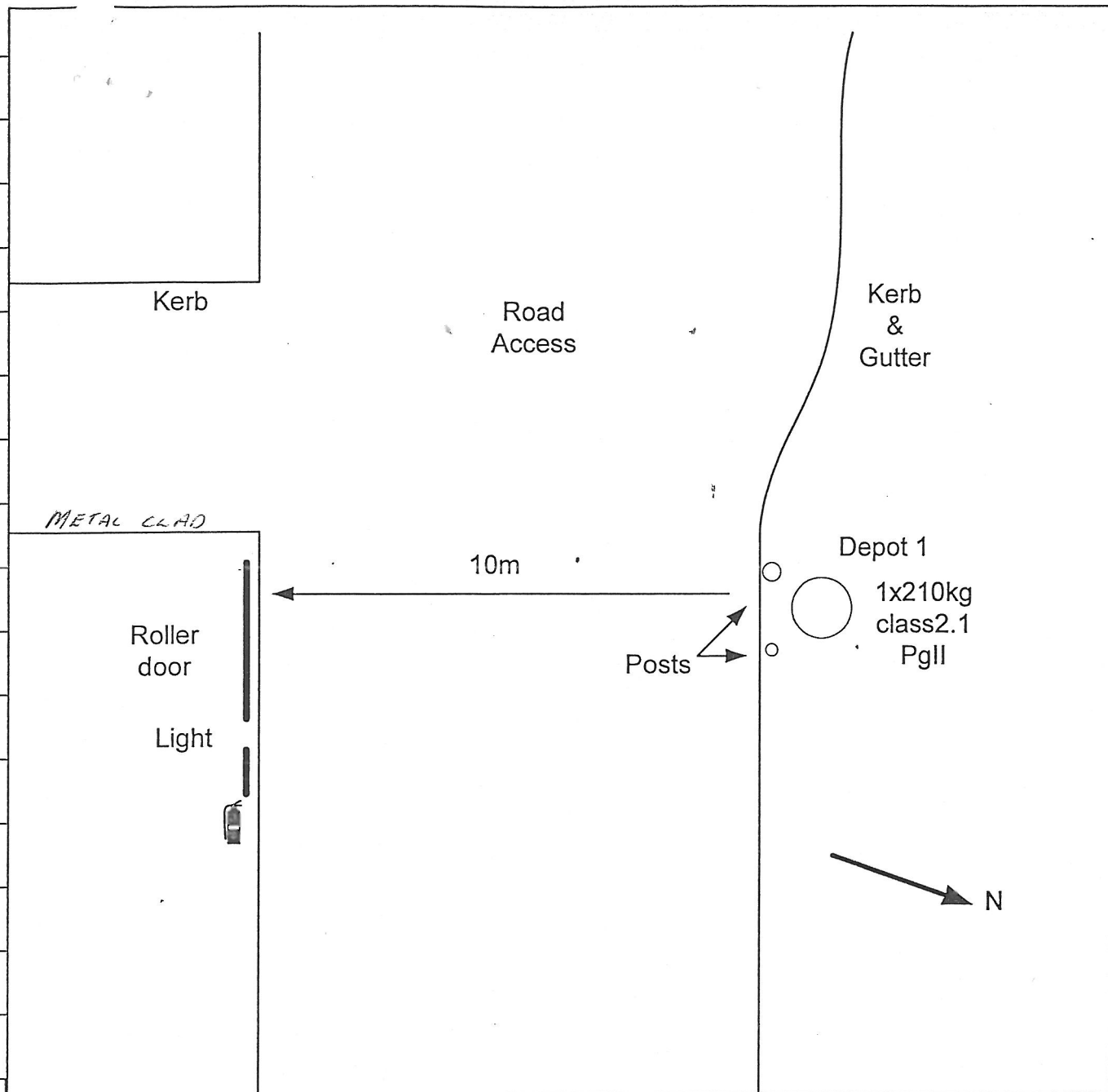
13 Signature of applicant

Date

Colin Butler 22-3-00

Please send your application, marked CONFIDENTIAL, to:

Dangerous Goods Licensing, Level 3, Locked Bag 10, Clarence Street,
SYDNEY NSW 2000



EQUIPMENT INSTALLED AS PER DRAWING

SIGNED:
 DATE:
 ON BEHALF OF:

CUSTOMER BUDPLANT P/L
 ADDRESS: TOOHEYS ROAD EAST WYEE
 CONTACT: COLIN BUTTEL

DEPOT (TITLE) 1

FOR (QUANTITY) 210KG
 of **DG Class** 2.1 and **Pg** II

as shown in this plan conforms with
 the Dangerous Goods Act 1975 and Australian Standard(s)

A.S. 1596-97

Signature: *B. Strickland*

Date: 15.02.00

Name: BRUCE STRICKLAND

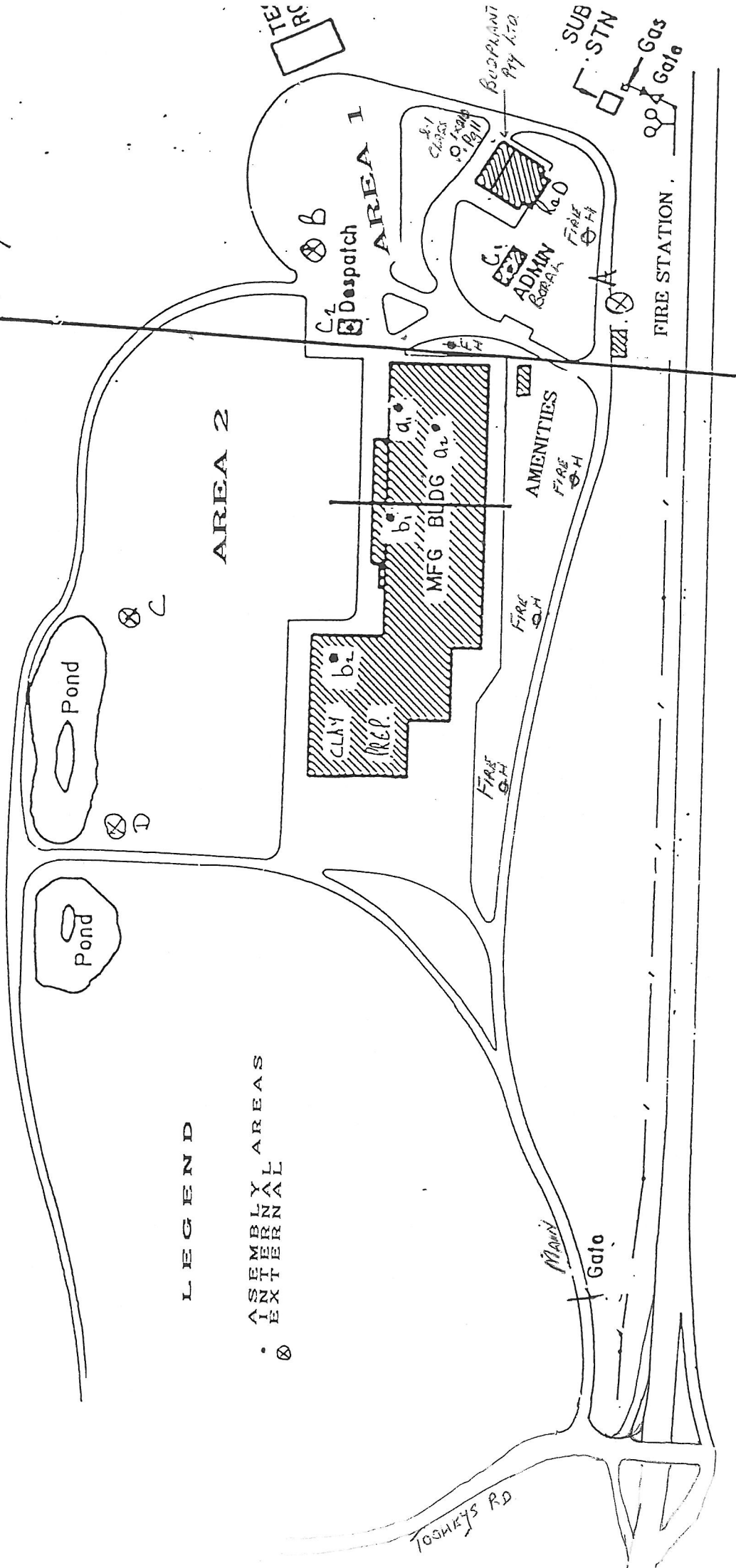
DATE: 15.02.00	DRAWER: B. STRICKLAND
TANK SIZE: 1X210KG	APPLICATION: Forklift Decanting

BORAL ENERGY, EGRET STREET, KOORAGANG ISLAND, 2304 (P O BOX 517) MAYFIELD, 2304

SITE PLAN

BORAL MONTORO, WYEE
'EMERGENCY PREPAREDNESS'

01/022047



DIAL 2644 {BUSINESS HOURS}
NO. 6 BY {A/HOURS PRODUCTION}
BY RADIO

EMERGENCY INTERNAL



WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D12/076151
Your Ref: Malcolm Adrien

20 June 2012

Attention: Malcolm Adrien
David Lane Associates
Unit 2B,
30 Leighton Place
Hornsby NSW 2077

Dear Mr Adrien,

RE SITE: 9 Kiar Ridge Rd Kiar NSW

I refer to your site search request received by WorkCover NSW on 15 June 2012 requesting information on licences to keep dangerous goods for the above site.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has not located any records pertaining to the above mentioned premises.

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Brent Jones
Senior Licensing Officer
Dangerous Goods Team



WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D12/076151
Your Ref: Malcolm Adrien

20 June 2012

Attention: Malcolm Adrien
David Lane Associates
Unit 2B,
30 Leighton Place
Hornsby NSW 2077

Dear Mr Adrien,

RE SITE: 776 Tooheys Rd Bushells Ridge NSW

I refer to your site search request received by WorkCover NSW on 15 June 2012 requesting information on licences to keep dangerous goods for the above site.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has not located any records pertaining to the above mentioned premises.

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

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T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D12/076151
Your Ref: Malcolm Adrien

20 June 2012

Attention: Malcolm Adrien
David Lane Associates
Unit 2B,
30 Leighton Place
Hornsby NSW 2077

Dear Mr Adrien,

RE SITE: 106 Tooheys Rd Bushells Ridge NSW

I refer to your site search request received by WorkCover NSW on 15 June 2012 requesting information on licences to keep dangerous goods for the above site.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has not located any records pertaining to the above mentioned premises.

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

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92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D12/076151
Your Ref: Malcolm Adrien

20 June 2012

Attention: Malcolm Adrien
David Lane Associates
Unit 2B,
30 Leighton Place
Hornsby NSW 2077

Dear Mr Adrien,

RE SITE: 84 Tooheys Rd Bushells Ridge NSW

I refer to your site search request received by WorkCover NSW on 15 June 2012 requesting information on licences to keep dangerous goods for the above site.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has not located any records pertaining to the above mentioned premises.

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely


Brent Jones
Senior Licensing Officer
Dangerous Goods Team

APPENDIX H – QUALITY ASSURANCE / QUALITY CONTROL

APPENDIX C1 – FIELD QUALITY CONTROL

During the assessment of contaminated sites, the integrity of data collected is considered paramount. With the assessment of the Site, a number of measures were taken to ensure the quality of the data. These included:

Sample Containers

Soil samples collected during the investigation were placed immediately into laboratory prepared glass jars with Teflon lid inserts. Standard identification labels were adhered to each individual container and labelled according to depth, date, sampling team and media collected.

Decontamination

All equipment used in the sampling program which includes a hand auger, spades and mixing bowl was decontaminated prior to use and between samples to prevent cross contamination. Decontamination of equipment involved the following procedures:

- Cleaning equipment in potable water to remove gross contamination;
- Cleaning in a solution of Decon 90; and,
- Rinsing in clean demineralised water then wiping with clean lint free cloths.

Sample Tracking, Identification and Holding Times

All samples were forwarded to Envirolab Services and ASET under recognised chain of custodies with clear identification outlining the date, location, sampler and sample ID. All samples were recorded by the laboratory as meeting their respective holding times. The sample tracking system is considered adequate for the purposes of sample collection.

Sample Transport

All samples were packed into an esky with ice from the time of collection. These were transported under chain of custody from the site to Envirolab Services Pty Ltd and SGS Australia, NATA registered laboratories located in Chatswood and Alexandria respectively. During the project, the laboratory reported that all the samples arrived intact and were analysed within holding times for the respective analytes. Samples were kept below 4°C at all times. All Trip Spike results were within acceptance criteria providing validation that the transport procedures were satisfactory.

Field Duplicate Samples

Field duplicate samples for soil were prepared in the field through the following process:

- A larger than normal quantity of soil is recovered from the sample location selected for duplication;

Confidential and Subject to Legal Professional Privilege

- The sample is placed in a decontaminated stainless bowl and mixed as thoroughly as practicable before being divided into equal parts;
- Two portions of the sub-sample are immediately transferred, one for an intra-laboratory duplicate and another as a sample; and,
- Samples are placed into a labelled, laboratory supplied 250ml glass jar and sealed with an airtight, Teflon screw top lid. The fully filled jars are labelled as the sample and duplicate and immediately placed in a chilled esky.

Duplicate samples were prepared on the basis of sample numbers recovered during the field work. The duplicate sample frequency was computed using the total number of samples analysed as part of this assessment. The duplicate sample frequencies are shown below:

SOIL SAMPLES	22 Samples	2 intra-laboratory duplicate	9.1%
---------------------	-------------------	------------------------------	------

Comparisons were made of the laboratory test results for the duplicate samples with the original samples and the Relative Percentage Difference (RPD) calculated as difference / average in order to assess the accuracy of the sampling and laboratory test procedures. The comparisons between the duplicates and original samples indicate acceptable RPDs when they comply with criteria which are commonly set at:

- Less than 30% for inorganics and 50% for organics;
- Less than five times the Laboratory LOR; and,
- The difference between concentrations is less than 5% of the relevant HIL concentration.

Table C3 gives details of intra laboratory and inter laboratory chemical duplicates.

Table C3 – Calculated Intra-Laboratory RPDs for Heavy Metal Samples

DUPLICATE	HEAVY METALS							
	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn
W1	4	0.3	4.1	22.0	30.0	ND	3.8	77.0
W1A	5	0.05	4.2	21.0	29.0	ND	4.9	75.0
RPD	22%	143%	2%	5%	3%	N/A	25%	3%
BOR-1	ND	ND	4.6	0.6	6.0	ND	ND	2.5
BOR-1A	ND	ND	3.2	0.5	4.0	ND	ND	1.8
LOR	N/A	N/A	36%	18%	40%	N/A	N/A	33%
W1	4	0.3	4.1	22	30	ND	3.8	77.0
W1B	0.05	0.05	6	19	27	ND	3.0	67.0
RPD	195%	143%	38%	15%	11%	N/A	24%	14%
Criteria RPD%	30	30	30	30	30	30	30	30
LOR	4/3	0.5/0.3	1/0.3	1/0.5	1/1	0.1/0.05	1/0.5	1/0.5

Field duplicates provide an indication of the whole validation process, including the sampling process, sample preparation and analysis. The two intra laboratory duplicates exceeded the DQO of 30% for four heavy metal concentrations. The differences in concentrations of the following intra-laboratory duplicate pairs were for reported concentrations of less than 5% of the relevant HIL concentration:

- w1.

It is to be noted that for samples with concentrations of less than the LOR, the concentration has been modified to half the LOR value to assist in statistical RPD calculations and data quality assessment.

APPENDIX C2 – LABORATORY ANALYTICAL AND QUALITY PLAN

The integrity of analytical data provides the second step in the QA/QC process for total data compliance. The data validation techniques adopted by DLA are based upon techniques published by the USEPA and in line with methods and guidelines adopted by the NSW EPA and outlined in the NEPM (NEPC, 2013). Descriptions are provided of the specific mechanisms used in the assessment of accuracy, precision and useability of analytical data within the project.

Blanks

Blanks were used for the identification of false positive data. Laboratory blank samples were analysed. No cross contamination of samples is said to have occurred as a result of laboratory techniques provided all blanks show concentrations below the levels of detection. No results on blank samples were above the level of reporting for any determination during the project.

Spikes and Control Samples

Control sample spikes were utilised for determination of matrix recovery analysis. This involves analysis of spiked control samples and their duplicates, spiked with a known concentration of relative analyte. Accuracy was assessed by calculation of the percent recovery (%R). The duplicate sample spikes were used to assess the precision of the methods used. The recoveries for all matrix spike analysis were within the acceptance criteria of 60-140%.

Duplicates

Laboratory Duplicates are tested to ensure the results meet the requirements of QA/QC. The %RPD for all intra-laboratory duplicates had concentrations that complied with the criteria set for acceptable RPDs.

Surrogates

To assess the performance of individual organic analysis the laboratory used surrogates. Recoveries were calculated for each surrogate providing an indication of analytical accuracy. Surrogate recoveries for soil samples were all within recommended control limits, indicating that there was an acceptable degree of accuracy in analysing for organic compounds.

Laboratory Detection Limits

Laboratory detection limits for soil and water analyses by Envirolab are outlined in **Table C5** below:

Table C5 – Method of Soil Analysis: Envirolab

ANALYTE	METHOD	LEVEL OF REPORTING Soil mg/kg	
PAH	USEPA SW-846 Method 8270,	0.1 (Ind. Analyte)	
		Hg	<0.10
Metals	USEPA 200.7 USEPA 7471A	As-Cd-Cr-Cu	<0.10
		Ni-Pb-Zn	<0.5
Pesticides	USEPA SW-846 Method 8081 USEPA SW-846 Method 8140 USEPA SW-846 Method 8080 USEPA SW-846 Method 8870	OCP	0.10
		OPP	0.10
PCB	USEPA SW-846 Method 8080 USEPA SW-846 Method 8081	PCB	0.10
		Benzene	1.0
BTEX	USEPA SW-846 Method 8260	Toluene	1.0
		Ethylbenzene	1.0
TRH	USEPA SW-846 Method 8260 USEPA SW-846 Method 8000	Total Xylene	3.0
		C6-C9	25
TRH	USEPA SW-846 Method 8260 USEPA SW-846 Method 8000	C10-C14	50
		C15-C28	100
TRH	USEPA SW-846 Method 8260 USEPA SW-846 Method 8000	C29-C36	100

APPENDIX I – PRINT GALLERY



WALLARAH PHASE 1 CONTAMINATION IMPACT ASSESSMENT - ADDENDUM

Print Gallery

November 2015-January 2016

DLA Environmental Services



Print 1 – WajcV Rural Land
Slab of Previously Removed Dwelling
Lot 126/DP755245



Print 2 – WajcV Rural Land
Material from Previously Removed
Dwelling
Lot 126/DP755245



Print 3 – WAJCV Rural Land
General Waste
Lot 126/DP755245



Print 4 – WAJCV Rural Land
Open Paddock no Fill Materials
Encountered
Lot 128/DP658436



Print 5 – WAJCV Rural Land
Slab from Previously Removed Dwelling
Lot 103/DP755245



Print 6 – WAJCV Rural Land
Automotive Waste



Print 7— Boral Montoro Land
Bunds Looking West to WAJCV Land
Lot 194/DP1032847



Print 8— Boral Montoro Land
Bunds Looking East
Lot 194/DP1032847



Print 9— Boral Montoro Land
Bund Looking East
Lot 194/DP1032847



Print 10— Boral Montoro Land
Bund Looking West
Lot 194/DP1032847



Print 11– Boral Montoro Land
Bund Material
Lot 168/DP705480



Print 12– Boral Montoro Land
Bund Material
Lot 168/DP705480



Print 13 – RMS Land
Dumped Waste Material



Print 14– RMS Land
Vegetated Land Between Boral Site and
Motorway Link Road



Print 15 – RMS Land
Vegetated Land Between Boral Site and
Motorway Link Road



Print 16– RMS Land
Dumped Waste Material



Print 17 – Motorway Link Road Overpass
and South
Crown Road south of Overpass



Print 18– Motorway Link Road Overpass
and South
Dumped Asbestos Containing Material



Print 19 – Motorway Link Road Overpass
and South
Fill Material



Print 20 – Motorway Link Road Overpass
and South
Land Adjacent to Main Northern Rail Line



Print 21 – Crown Road and Spring Creek
Entrance to Rail Corridor



Print 22 – Crown Road and Spring Creek
Spring Creek Causeway



Print 23 – Crown Road and Spring Creek
Crown Land Adjacent to Main Northern
Rail Line



Print 24 – Main Northern Rail Line
Corridor



Print 25 – Main Northern Rail Line
Corridor



Print 26 – Main Northern Rail Line
Corridor
Embankment Adjoining Crown Land